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REPORT

OF THE

DIRECTOR OF THE MINT

UPON THE

PRODUCTION

OF THE

PRECIOUS METALS IN THE UNITED STATES

DURING THE

CALENDAR YEAR 1897.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

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TREASURY DEPARTMENT,

Document No. 2058.

Director of the Mint.

MAY 15 1903

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
Washington, D. C., October 21, 1898.

SIR: I have the honor to hand you herewith my report upon the production of gold and silver in the United States, and in the world, for the calendar year 1897, together with such information as to their coinage and consumption as this Bureau has been able to gather. The returns for this country have been carefully obtained through officials and special agents of this Bureau, and the aggregate of precious metals reported has been actually traced from production to market. The figures are therefore conservative, but are believed approximately full. The statistics for foreign countries are obtained from official sources wherever governmental calculations are made, and where such returns can not be had the best obtainable estimates are given and the authority stated.

Respectfully, yours,

GEORGE E. ROBERTS,
Director of the Mint.

To the Honorable SECRETARY OF THE TREASURY.

PART I.

PRODUCTION, EMPLOYMENT, AND MOVEMENT OF GOLD AND SILVER IN THE UNITED STATES, AND SURVEY OF THE WORLD'S PRODUCTION OF GOLD AND SILVER IN 1897.

GENERAL REPORT.

PRODUCTION OF GOLD IN THE UNITED STATES, CALENDAR YEAR 1897.

The production of gold in the United States in the calendar year 1897 was 86,312 kilograms, or 2,774,935 ounces fine, of the value of $57,363,000, while that of the South African Republic was 86,720 kilograms, or 2,788,038 ounces fine, of the value of $57,633,861; that of Australasia, 83,786 kilograms, or 2,693,722 ounces fine, of the value of $55,684,182, and that of Russia, 34,977 kilograms, or 1,124,514 ounces fine, of the value of $23,245,763. No other country had a gold output in 1897 approximating any of the above four, which together yielded $194,599,500 in a total of $237,504,800 extracted from the mines of the world.

It appears that the United States lost in 1897 the position it so long occupied as the chief gold-producing country. The gold excitement in the Klondike contributed to the reduction of product in both Alaska and California, and but for this the United States would probably have kept the lead another year. The conditions in South Africa, however, where a great ascertained bed of low-grade ore is being exploited by companies with ample capital, are such that it would doubtless have come to the front in 1898, if not in 1897.

The United States gold product in 1897 exceeded that of 1896 by $4,275,000. This increase was due most largely to the State of Colorado, whose gold output in 1897 exceeded that of 1896 by over $4,000,000. The 1897 yield of gold in South Dakota was over $725,000 more than in 1896, and in Nevada a little over $500,000. The other States that contributed to the increase are Arizona, Michigan, Montana, Oregon, South Carolina, and Washington.

The gold product of California in 1897 was over $600,000 less than in 1896, Idaho's over $400,000, and Alaska's over $200,000. Other States whose gold yield showed a diminution in 1897 are Georgia, New Mexico, North Carolina, Texas, and Utah.

It is noteworthy that the gold product of the United States in 1897, $57,363,000, is the largest since 1854, and was exceeded only in the years 1852, 1853, and 1854, immediately after the discovery of the Californian placers.

In estimating the gold yield of the United States in any given year only that gold is looked upon as really produced that has been refined—made ready for the market—and the ascertained amount of domestic

origin (which is comparatively insignificant) that has been exported to foreign countries for reduction.

It has been the custom of the Bureau of the Mint to make for every calendar year two independent calculations of the gold product of the country, and to take their mean as the closest approximation that can be had to the actual outturn of the mines. The first of these is based on the amount of gold put upon the market by private refineries during the year, plus the fine gold contained in the unrefined of domestic production deposited at the mints and assay offices of the United States, plus the pure metal of domestic production contained in ores, copper matte, etc., exported to other countries for reduction. The second calculation is based on the known disposition made of the newly produced gold in any calendar year. Such gold is either deposited at the mints and assay offices of the United States, or exported from the United States in the form of bullion, ores, or copper matte, or used in the industrial arts. If foreign gold bullion enters into any of the above items, its amount must of course be deducted.

Put in tabular form, the first calculation of the gold product of the United States in the calendar year 1897 assumes the following shape:

APPROXIMATE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1897.

Items reported for 1897.	Fine ounces.
Domestic product in fine gold bars reported by private refineries	1,975,236
Unrefined gold of domestic production deposited at the mints and assay offices	783,103
Domestic gold contained in ores, copper matte, etc., exported for reduction	17,949
Total	2,776,338

The second calculation of the gold yield of the mines of the United States in the calendar year 1897, reduced to a table, is here shown:

APPROXIMATE DISPOSITION OF THE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1897.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production	3,111,070
Domestic bullion other than United States mint or assay office bars, exported from the United States	30,119
Domestic gold in ores, copper matte, etc., exported	17,949
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts	22,522
Total	3,181,660
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine gold bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production, but derived from foreign ores	408,127
Net total	2,773,533

Either of the results found in the above tables is a pretty close approximation to the actual gold yield of the United States in 1897. Their mean (86,312 kilograms or 2,774,935 ounces fine, of the value of $57,363,000) may be considered as the nearest approach to the actual quantity and value of the gold extracted from the mines of this country in the calendar year 1897.

The gold product of the United States in the years 1896 and 1897, and the States and Territories in which there was an increase or decrease of the yield in the latter year, as well as the net increase, are shown in the following table:

TABLE SHOWING THE PRODUCT OF GOLD IN THE SEVERAL STATES AND TERRITORIES IN 1896 AND 1897, AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Value.			
	1896.	1897.	Increase.	Decrease.
Alaska	$2,055,700	$1,778,000	.....	$277,700
Arizona	2,604,200	2,895,900	$291,700	.....
California	15,235,900	14,618,300	.....	617,600
Colorado	14,911,000	19,104,200	4,193,200	.....
Georgia	151,000	149,300	.....	1,700
Idaho	2,155,300	1,701,700	.....	453,600
Michigan	37,200	62,700	25,500	.....
Montana	4,324,700	4,373,400	48,700	.....
Nevada	2,468,300	2,976,400	508,100	.....
New Mexico	475,800	356,500	.....	119,300
North Carolina	44,300	34,600	.....	9,700
Oregon	1,251,000	1,353,100	102,100	.....
South Carolina	63,300	84,700	21,400	.....
South Dakota	4,969,800	5,694,900	725,100	.....
Texas	8,000	7,400	.....	600
Utah	1,899,900	1,726,100	.....	173,800
Washington	405,700	419,900	14,200	.....
Alabama, Iowa, Maryland, Minnesota, Tennessee, Vermont, Virginia, Wyoming	26,900	25,900	.....	1,000
Total	53,068,000	57,363,000	5,930,000	1,655,000
Net increase	.....	.....	4,275,000	.....

PRODUCTION OF SILVER IN THE UNITED STATES, CALENDAR YEAR 1897.

The silver product of the United States in any given calendar year is estimated in precisely the same manner as the gold product, namely, by making two independent calculations of the same and taking their mean as the actual product.

The first calculation is as follows:

APPROXIMATE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1897.

Items reported for 1897.	Fine ounces.
Domestic product in fine silver bars reported by private refineries	52, 206, 614
Unrefined silver of domestic production deposited at the mints and assay offices	564, 913
Domestic silver contained in ores, copper matte, etc., exported for reduction	1, 700, 612
Total	54, 466, 139

And the second:

APPROXIMATE DISPOSITION OF THE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1897.

Disposition.		Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production		4, 666, 955
Domestic bullion other than United States mint or assay office bars, exported from the United States (custom-house rating at commercial value $50,107,970, corresponding, at average price of silver during the year, to $0.60 per fine ounce		83, 513, 300
Domestic silver in ores, copper matte, etc., exported		1, 700, 612
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts		2, 841, 494
Total		92, 722, 361
Deduct decrease in the approximate stock of silver bars, exclusive of any bars bearing the stamp of a United States mint or assay office in the United States, held by the Mercantile Safe Deposit Company and other institutions at the close of the calendar year 1897, according to information furnished the Bureau of the Mint ... fine ounces	175, 036	
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine silver bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production but derived from foreign ores ... fine ounces	39, 294, 556	39, 469, 592
Net total		53, 252, 769

The mean of these two results, in round numbers, is 1,675,582 kilograms, or 53,860,000 ounces, fine, of the commercial value, at the average price of silver during the year ($0.60), of $32,316,000 and the coining value of $69,637,172, is the estimated silver product of the United States in the calendar year 1897.

The difference between the two estimates, amounting to about 1,200,000 ounces, is larger than usual. But this difference, large as it is, by no means discredits the method followed by this bureau in making the estimate, for it can be readily explained. The number of ounces constituting the second item, in the second calculation, is obtained from the invoiced value of domestic bullion other than United States Mint or Assay Office bars exported from the United States in the calendar year 1897, namely $50,107,970, by dividing the latter sum by the average quoted London price of an ounce of fine silver during the year,

namely, $0.60 per fine ounce. The result can only be an approximation, for the reason that while the export of silver is at the price paid by London, the invoice price is not, as is assumed in the table, in the absence of minuter information, always the quoted London price.

Doubtless, three-quarters of the time, the London quotation is the exact amount London will pay for silver to be shipped within ten days. Sometimes, however, the quotation is nominal and London purchasers pay slightly above or slightly below it. Then again the market sometimes changes during the day and will advance after the quotation is made or sometimes decline after the quotation is made.

Sales may, and probably do, vary in a very large number of cases from the quotation of the day the sale is made. Furthermore, the average price for the year, based on the highest and lowest quotations, may not be the average price at which all sales were made. The heaviest sales may have been made at the lowest price. Indeed, it is likely to be the case that when the offerings are heavy the price will be below the average. Instead, therefore, of the average price of fine silver actually sold having been $0.60, it may have been sufficiently lower to raise the number of ounces corresponding to the total invoiced value given in item 2 in the second table above, viz, 83,513,300 fine ounces, so that the result of the second calculation would come much nearer to that of the first than it does.

There was a decrease, probably due to the declining price of silver, of nearly 5,000,000 ounces, fine, in the silver product of the United States in 1897, as compared with 1896. The yield of Utah shows the greatest decline—2,562,000 ounces. Next comes Montana, with a decrease of 1,069,600 ounces, and Colorado, of 936,600 ounces.

Other States whose silver product in 1897 declined, as compared with 1896, are Alaska, California, Idaho, New Mexico, South Dakota, Texas, and Washington.

The States whose silver product in 1897 increased, as compared with 1896, are Arizona, Nevada, and Oregon.

A table is here given showing the product of silver in the several States and Territories in 1896 and 1897, and the increase and decrease of the production of each in the latter year:

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1896 AND 1897 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Weight.			
	1896.	1897.	Increase.	Decrease.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Alaska	145,300	116,400	.....	28,900
Arizona	1,913,000	2,239,900	326,900	.....
California	600,600	474,400	.....	126,200
Colorado	22,573,000	21,636,400	.....	936,600
Georgia	600	600	.....	.....
Idaho	5,149,900	4,901,200	.....	248,700

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1896 AND 1897, ETC.—Continued.

State or Territory.	Weight.			
	1896.	1897.	Increase.	Decrease.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Michigan	59,000	60,300	1,300	.....
Montana	16,737,500	15,667,900	.....	1,069,600
Nevada	1,048,700	1,228,900	180,200	.....
New Mexico	687,800	539,500	.....	148,300
North Carolina	500	300	.....	200
Oregon	61,100	69,000	7,900	.....
South Carolina	300	200	.....	100
South Dakota	229,500	147,600	.....	81,900
Texas	525,400	404,700	.....	120,700
Utah	8,827,600	6,265,600	.....	2,562,000
Washington	274,900	106,900	.....	168,000
Alabama, Maryland, Tennessee, Virginia	100	200	100	.....
Total	58,834,800	53,860,000	516,400	5,491,200
Net decrease	.....	.....	.....	4,974,800

A table is next appended showing the product of gold and silver of the individual States and Territories, as reported by Mint officers and agents, for the calendar year 1897:

PRODUCT OF GOLD AND SILVER OF THE INDIVIDUAL STATES AND TERRITORIES, REPORTED BY MINT OFFICERS AND AGENTS FOR THE CALENDAR YEAR 1897.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	409	$8,455	100	$129	$8,584
Alaska	118,014	2,439,572	132,011	170,681	2,610,253
Arizona	122,059	2,523,183	2,574,329	3,328,425	5,851,608
California	767,779	15,871,401	754,648	975,707	16,847,108
Colorado	946,802	19,572,137	21,020,852	27,178,475	46,750,612
Georgia	7,461	154,223	656	848	155,071
Idaho	102,813	2,125,333	5,493,975	7,103,321	9,228,654
Maryland	18	364	2	2	366
Michigan	3,032	62,677	60,267	77,921	140,598
Montana	217,515	4,496,431	16,807,346	21,730,710	26,227,141
Nevada	150,580	3,112,765	1,262,972	1,632,934	4,745,699
New Mexico	22,871	472,789	438,771	567,300	1,040,089
North Carolina	1,870	38,646	349	451	39,097
Oregon	65,528	1,354,593	84,802	109,643	1,464,236
South Carolina	4,141	85,609	243	314	85,923
South Dakota	272,411	5,631,237	146,622	189,572	5,820,809
Tennessee	7	145	1	1	146
Texas	356	7,359	404,676	523,217	530,576
Utah	89,297	1,845,938	6,689,754	8,649,379	10,495,317
Virginia	207	4,280	9	12	4,292
Washington	21,752	449,664	242,780	313,898	763,562
Wyoming	1,328	27,350	.....	.....	27,350
Total	2,916,245	60,284,151	56,115,165	72,552,940	132,837,091

It will be noticed that the product of both gold and silver reported by the agents is greater than that calculated by this Bureau. The reason of this is clear. The one—that made by this Bureau—is of the finished product, fine metal ready for the market; the other is the value of the metal supposed to be in the ore before it is yet smelted and refined. The table last given above can not be taken as final and must be replaced by another in which the value of the pure metal produced, as estimated by this Bureau, is prorated among the several States and Territories in proportion to the amount of gold and silver claimed by the agents to have been produced in them in 1897.

This second table is here appended:

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1897, AS ESTIMATED BY THE DIRECTOR OF THE MINT.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	358	$7,400	100	$129	$7,529
Alaska	86,011	1,778,000	116,400	150,497	1,928,497
Arizona	140,089	2,895,900	2,239,900	2,896,032	5,791,932
California	707,160	14,618,300	474,400	613,366	15,231,666
Colorado	924,166	19,104,200	21,636,400	27,974,335	47,078,535
Georgia	7,222	149,300	600	776	150,076
Idaho	82,320	1,701,700	4,901,200	6,336,905	8,038,605
Iowa	5	100	.....	.....	100
Maryland	5	100	.....	.....	100
Michigan	3,033	62,700	60,300	77,964	140,664
Minnesota	145	3,000	.....	.....	3,000
Montana	211,563	4,373,400	15,067,900	20,257,487	24,630,887
Nevada	143,983	2,976,400	1,228,900	1,588,881	4,565,281
New Mexico	17,246	356,500	539,500	697,535	1,054,035
North Carolina	1,674	34,600	300	388	34,988
Oregon	65,456	1,353,100	69,000	89,212	1,442,312
South Carolina	4,097	84,700	200	259	84,959
South Dakota	275,491	5,694,900	147,600	190,836	5,885,736
Tennessee	5	100	.....	.....	100
Texas	358	7,400	404,700	523,249	530,649
Utah	83,500	1,726,100	6,265,600	8,100,978	9,827,078
Vermont	5	100	.....	.....	100
Virginia	189	3,900	.....	.....	3,900
Washington	20,312	419,900	106,900	138,214	558,114
Wyoming	542	11,200	100	129	11,329
Total	2,774,935	57,363,000	53,860,000	69,637,172	127,000,172

In answer to the many interrogatories received by the Bureau relative to the sources of the production of the precious metals in the United States, the following table, compiled from reports made by the Mint officers and agents as to the sources of production for the calendar year 1897, shows the distribution, among the various gold and silver producing States and Territories, of the amount of gold and silver extracted from quartz, the amount of gold obtained from placer, and the amount of silver obtained from lead ores and copper ores as by-products:

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF THE UNITED STATES FOR THE CALENDAR YEAR 1897, AS TO SOURCES OF PRODUCTION AS REPORTED BY MINT OFFICERS AND AGENTS.

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Alabama	409	.....	100	.....	.....
Alaska	85,178	32,836	132,011	.....	.....
Arizona	121,439	620	1,802,030	205,947	566,352
California	529,094	238,685	504,601	90,167	159,880
Colorado	937,334	9,468	4,204,170	a16,816,682	.....
Georgia	6,163	1,298	656	.....	.....
Idaho	58,807	44,006	1,312,445	4,181,530	.....
Maryland	12	6	2	.....	.....
Michigan	3,032	.....	.....	.....	60,267
Montana	184,096	33,419	1,921,237	4,175,792	10,710,317
Nevada	148,302	2,278	990,918	272,054	.....
New Mexico	21,226	1,645	289,849	148,922	.....
North Carolina	787	1,083	349	.....	.....
Oregon	48,358	17,170	84,802	.....	.....
South Carolina	4,037	104	243	.....	.....
South Dakota	272,333	78	146,622	.....	.....
Tennessee	2	5	1	.....	.....
Texas	356	.....	404,676	.....	.....
Utah	89,297	.....	195,928	6,353,247	140,579
Virginia	24	183	9	.....	.....
Washington	15,101	6,651	242,780	.....	.....
Wyoming	.....	1,323	.....	.....	.....
Total	2,525,387	390,858	12,233,429	32,244,341	11,637,395

a Lead and copper ores.

The annual production of gold and silver from the mines of the United States from 1860 to 1897, inclusive, is shown in the following table:

(The commercial value of the silver product is reckoned at the average yearly market price of silver and its coining value in United States dollars.)

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES, 1860–1897.

[The estimate for 1860–1872 is by R. W. Raymond, commissioner, and since 1872 by the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860	2,225,250	$46,000,000	116,015	$157,000	$150,000
1861	2,080,125	43,000,000	1,546,875	2,062,000	2,000,000
1862	1,896,300	39,200,000	3,480,469	4,685,000	4,500,000
1863	1,935,000	40,000,000	6,574,219	8,842,000	8,500,000
1864	2,230,088	46,100,000	8,507,812	11,443,000	11,000,000
1865	2,574,759	53,225,000	8,701,171	11,642,000	11,250,000
1866	2,588,063	53,500,000	7,734,375	10,356,000	10,000,000
1867	2,502,197	51,725,000	10,441,406	13,866,000	13,500,000
1868	2,322,000	48,000,000	9,281,250	12,307,000	12,000,000
1869	2,394,563	49,500,000	9,281,250	12,298,000	12,000,000
1870	2,418,750	50,000,000	12,375,000	16,734,000	16,000,000
1871	2,104,313	43,500,000	17,789,062	23,578,000	23,000,000
1872	1,741,500	36,000,000	22,236,328	29,396,000	28,750,000
Total	29,012,908	599,750,000	118,065,232	157,366,000	152,650,000
1873	1,741,500	36,000,000	27,650,000	35,890,000	35,750,000
1874	1,620,563	33,500,000	28,849,000	36,869,000	37,300,000
1875	1,615,725	33,400,000	24,518,000	30,549,000	31,700,000
1876	1,930,162	39,900,000	30,009,000	34,690,000	38,800,000
1877	2,268,788	46,900,000	30,783,000	36,970,000	39,800,000
1878	2,476,800	51,200,000	34,960,000	40,270,000	45,200,000
1879	1,881,787	38,900,000	31,550,000	35,430,000	40,800,000
1880	1,741,500	36,000,000	30,320,000	34,720,000	39,200,000
1881	1,678,612	34,700,000	33,260,000	37,850,000	43,000,000
1882	1,572,187	32,500,000	36,200,000	41,120,000	46,800,000
1883	1,451,250	30,000,000	35,730,000	39,660,000	46,200,000
1884	1,489,950	30,800,000	37,800,000	42,070,000	48,800,000
1885	1,538,325	31,800,000	39,910,000	42,500,000	51,600,000
1886	1,693,125	35,000,000	39,440,000	39,230,000	51,000,000
1887	1,596,375	33,000,000	41,260,000	40,410,000	53,350,000
1888	1,604,841	33,175,000	45,780,000	43,020,000	59,195,000
1889	1,587,000	32,800,000	50,000,000	46,750,000	64,646,000
1890	1,588,880	32,845,000	54,500,000	57,225,000	70,465,000
1891	1,604,840	33,175,000	58,330,000	57,630,000	75,417,000
1892	1,596,375	33,000,000	63,500,000	55,563,000	82,101,000
1893	1,739,323	35,955,000	60,000,000	46,800,000	77,576,000
1894	1,910,813	39,500,000	49,500,000	31,422,000	64,000,000
1895	2,254,760	46,610,000	55,727,000	36,445,000	72,051,000
1896	2,568,132	53,088,000	58,835,000	39,655,000	76,069,000
1897	2,774,935	57,363,000	53,860,000	32,316,000	69,637,000
Total	45,526,548	941,111,000	1,052,271,000	1,015,054,000	1,360,457,000
Grand total	74,539,456	1,540,861,000	1,170,336,232	1,172,420,000	1,513,107,000

Tables showing the product of gold and silver from mines of the United States since 1792 will be found in the Appendix.

DEPOSITS OF GOLD.

The deposits of gold at the mints and assay offices during the calendar year 1897 were 4,253,333 fine ounces, of the value of $87,924,232, and the redeposits contained 1,759,114 fine ounces, of the value of $36,364,117.

The domestic bullion amounted to 2,111,070 fine ounces, of the value of $64,311,531. For convenience of the Bureau the domestic bullion has been classified as unrefined, refinery bars, and refined bullion, unrefined being bullion received direct from the miners in its crude state, refinery bars (less than 0.992 in fineness) and refined bars (0.992 and over in fineness) being the product of certain smelters, refineries, cyanide and chlorination works deposited at the mints and assay offices.

The amount of foreign bullion deposited contained 258,266 fine ounces, valued at $5,338,844. The unrefined foreign bullion contained 182,523 fine ounces and the refined bullion 75,743 fine ounces, reported to have been received from the following countries:

Countries.	Fine ounces.
UNREFINED.	
Nova Scotia	29,764
Canada	53,648
Mexico	63,600
Central America	18,075
West Indies	40
South America	17,291
Africa	17
Korea	88
Total	182,523
REFINED.	
Australasia and New Zealand	43,782
England	31,961
	75,743
Grand total	258,266

Mutilated and uncurrent domestic gold coin containing 17,268 fine ounces of the coinage value of $356,957 were transferred from the Treasury to the mints for recoinage, and 18,696 fine ounces valued at $386,487 represented the uncurrent domestic coins purchased over the counter at the mints.

Foreign gold coin containing 709,262 fine ounces and old jewelry containing 138,771 fine ounces were also received, and represented a coining value of $17,530,413.

REDEPOSITS OF GOLD.

The mint at Philadelphia received as redeposits gold bullion containing 1,724,857 fine ounces, as shown by the following table:

Institution at which manufactured.	Character of bars redeposited.		
	Fine bars.	Mint bars.	Unparted bars.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*
Mint at Philadelphia	5	.....	.....
Assay office at New York	680,998	287,648	.....
Mint at Denver	240,188	.....	331,949
Assay office at—			
Helena	.....	.....	109,891
Boise	.....	.....	56,717
Charlotte	.....	.....	12,721
St. Louis	.....	.....	4,740
Total	921,191	287,648	516,018

The mint at San Francisco received as redeposits 20,574 fine ounces of fine gold bars, all of which were made by the mint at Carson.

The assay office at New York received as redeposits 138 fine ounces of gold, 74 fine ounces of which were small fine bars made at that office. Unparted bars containing 63 fine ounces made at the mint at Denver, and a small unparted bar containing 0.242 fine ounces made at the assay office at St. Louis, were also received as redeposits.

The mint at Denver received as redeposits 512 fine ounces of gold, 13 fine ounces of which were fine bars made at the assay office at New York, and 499 fine ounces contained in unparted bars made at the mint at Denver.

The assay office at Helena reports 254 fine ounces of gold redeposited, all the bars of which were made at that office.

The assay office at Boise reports the amount of redeposits as 11,745 fine ounces of gold, all of which were unparted bars originally made at that office.

The assay office at St. Louis reports the redeposits of gold at 34 fine ounces of gold, being small fine bars manufactured at the mint at Philadelphia.

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1896 AND 1897, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase, 1897.	Decrease, 1897.
	1896.	1897.		
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Domestic bullion, unrefined	838,045	783,103	.....	54,942
Domestic bullion, refinery bars	329,542	596,501	266,959	.....
Domestic bullion, refined	1,644,514	1,731,466	86,952	.....
Total domestic bullion	2,812,101	3,111,070	353,911	54,942
Domestic coin, Treasury transfers	53,410	17,268	.....	36,142
Domestic coin purchased	39,611	18,696	.....	20,915
Foreign bullion, unrefined	126,903	182,523	55,620	.....
Foreign bullion, refined	515,075	75,743	.....	439,332
Foreign coin melted	745,277	709,262	.....	36,015
Jewelers' bars, etc	145,723	138,771	.....	6,952
Total deposits	4,438,100	4,253,333	409,531	594,298
Redeposits:				
Fine bars	312,335	942,886	630,551	.....
Mint bars	483,880	287,648	.....	196,232
Unparted bars	402,935	528,580	125,645	.....
Total redeposits	1,199,150	1,759,114	756,196	196,232
Total gold operated on	5,637,250	6,012,447	1,165,727	790,530

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1896 AND 1897, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEARS.

Classification of deposits of gold bullion.	Calendar year.		Increase, 1897.	Decrease, 1897.
	1896.	1897.		
Domestic bullion, unrefined	$17,323,926	$16,188,179	.....	$1,135,747
Domestic bullion, refinery bars	6,812,238	12,330,764	$5,518,526	.....
Domestic bullion, refined	33,995,130	35,792,588	1,797,458	.....
Total domestic bullion	58,131,294	64,311,531	7,315,984	1,135,747
Domestic coin, Treasury transfers	1,104,088	356,957	.....	747,131
Domestic coin purchased	818,836	386,487	.....	432,349
Foreign bullion, unrefined	2,623,322	3,773,096	1,149,774	.....
Foreign bullion, refined	10,647,540	1,565,748	.....	9,081,792
Foreign coin melted	15,406,241	14,661,753	.....	744,488
Jewelers' bars, old plate, etc	3,012,348	2,868,660	.....	143,688
Total deposits	91,743,669	87,924,232	8,465,758	12,285,195
Redeposits:				
Fine bars	6,456,530	19,491,186	13,034,656	.....
Mint bars	10,002,695	5,946,222	.....	4,056,473
Unparted bars	8,329,418	10,926,709	2,597,291	.....
Total redeposits	24,788,643	36,364,117	15,631,947	4,056,473
Total gold operated on	116,532,312	124,288,349	24,097,705	16,341,668

DEPOSITS OF SILVER.

Silver is coined in the United States on Government account only. Deposits of silver bullion are received by the mints and assay offices of the United States for return to the depositor in fine or unparted bars with the weight and fineness stamped thereon. The deposits of silver for return in fine bars are confined almost exclusively to the New York Assay Office, only a small amount being deposited at other institutions. Fine silver bars manufactured for depositors are either exported or sold for use in the industrial arts in the United States.

The deposits of silver at the mints and assay offices during the calendar year 1897 were 9,828,169 fine ounces, of the coining value of $12,707,128, and the redeposits contained 208,727 fine ounces, of the coining value of $269,869.

The domestic bullion amounted to 4,666,953 fine ounces, of the coining value of $6,034,043. For the convenience of the Bureau the domestic silver bullion has been classified as unrefined, refinery bars, and refined bars, similar to domestic gold bullion.

The amount of unrefined foreign bullion deposited contained 574,663 fine ounces, of the coining value of $742,998, as follows:

UNREFINED FOREIGN SILVER BULLION.

Countries.	Fine ounces.
Nova Scotia	1,475
Canada	13,561
Mexico	541,143
Central America	14,694
West Indies	124
South America	3,657
Africa	3
Korea	6
Total	574,663

There were no deposits of foreign refined bullion during the year.

The Treasurer of the United States transferred to the mint uncurrent silver coins containing 4,012,110 fine ounces, of the coining value of $5,187,375. There were received over the counter at the mints old and worn coin containing 3,812 fine ounces, representing $4,927. This amount includes 317 trade dollars.

Foreign coin containing 90,183 fine ounces, and jewelers' bars and old plate containing 480,448 fine ounces, represented, upon melting, a value of $737,785.

REDEPOSITS OF SILVER.

The mint of Philadelphia received as redeposits silver bullion containing 183,731 fine ounces, as follows:

Institution at which manufactured.	Character of bars redeposited.	
	Fine bars.	Unparted bars.
	Fine ounces.	*Fine ounces.*
Assay office at New York	87,320	.....
Mint at Denver	.....	51,046
Assay office at—		
Helena	.....	29,452
Boise	.....	13,634
Charlotte	.....	1,177
St. Louis	.....	1,102
Total	87,320	96,411

The assay office at New York received as redeposits 22,085 fine ounces of silver bullion. Fine bars containing 21,639 fine ounces were made at that office, while 6 fine ounces contained in unparted bars made at the mint at Denver, and 440 fine ounces in unparted bars made at the assay office, St. Louis, were also received.

The redeposits of silver at Denver amounted to 369 fine ounces in unparted bars, all of which were made at that mint.

The assay office at Helena reports the unparted bars redeposited as 118 fine ounces, all of which originated from that office.

The assay office at Boise reports as being redeposited 2,424 fine ounces, all in unparted bars, all of which were made at that office.

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1896 AND 1897 AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase, 1897.	Decrease, 1897.
	1896.	1897.		
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Domestic bullion, unrefined	479,407	564,912	85,505	.....
Domestic bullion, refinery bars	79,976	126,379	46,403	.....
Domestic bullion, refined	3,332,089	3,975,662	643,573	.....
Total domestic bullion	3,891,472	4,666,953	775,481	.....
Domestic coin, Treasury transfers	3,111,317	4,012,110	900,793	.....
Domestic coin purchased	3,307	3,563	256	.....
Trade dollars purchased	104	249	145	.....
Foreign bullion, unrefined	703,284	574,663	.....	128,621
Foreign bullion, refined	4,793	.....	.....	4,793
Foreign coin	169,591	90,183	.....	79,408
Jewelers' bars, old plate, etc	525,842	480,448	.....	45,394
Total deposits	8,409,710	9,828,169	1,676,675	258,216
Redeposits:				
Fine bars	13,056	108,959	95,903	.....
Unparted bars	100,952	99,768	.....	1,184
Total redeposits	114,008	208,727	95,903	1,184
Total silver operated on	8,523,718	10,036,896	1,772,578	259,400

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1896 AND 1897 AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase, 1897.	Decrease, 1897.
	1896.	1897.		
Domestic bullion, unrefined	$619,840	$730,392	$110,552	.....
Domestic bullion, refinery bars	103,403	163,400	59,997	.....
Domestic bullion, refined	4,308,155	5,140,251	832,096	.....
Total domestic bullion	5,031,398	6,034,043	1,002,645	.....
Domestic coin, Treasury transfers	4,022,712	5,187,375	1,164,663	.....
Domestic coin purchased	4,275	4,606	331	.....
Trade dollars purchased	135	321	186	.....
Foreign bullion, unrefined	909,296	742,998	.....	$166,298
Foreign bullion, refined	6,198	.....	.....	6,198
Foreign coin	219,269	116,600	.....	102,669
Jewelers' bars, old plate, etc	679,877	621,185	.....	58,692
Total deposits	10,873,160	12,707,128	2,167,825	333,857
Redeposits:				
Fine bars	16,880	140,877	123,997	.....
Unparted bars	130,524	128,992	.....	1,532
Total redeposits	147,404	269,869	123,997	1,532
Total silver operated on	11,020,564	12,976,997	2,291,822	335,389

GOLD AND SILVER (EXCLUDING REDEPOSITS) RECEIVED AT THE MINTS AND ASSAY OFFICES DURING THE CALENDAR YEARS 1880–1897.

Calendar year.	Gold.	Silver (coining value).	Total.
1880	$100,278,703	$35,103,825	$135,382,528
1881	98,763,426	30,326,848	129,090,274
1882	41,921,263	35,161,254	77,082,517
1883	51,089,456	36,978,184	88,067,640
1884	50,518,179	36,670,731	87,188,910
1885	44,714,052	35,836,725	80,550,777
1886	66,422,088	39,086,070	105,508,158
1887	74,724,077	46,381,333	121,105,410
1888	41,496,410	41,323,973	82,820,383
1889	42,599,206	41,977,265	84,576,471
1890	48,767,964	55,198,037	103,966,001
1891	60,849,552	70,994,120	131,843,672
1892	45,406,646	84,591,898	129,998,544
1893	69,419,223	62,465,005	131,884,228
1894	49,704,902	14,120,605	63,825,507
1895	69,433,579	13,843,636	83,277,215
1896	91,743,670	10,873,160	102,616,830
1897	87,924,232	12,707,128	100,631,360

COINAGE OF THE UNITED STATES.

The following table exhibits the number of fine ounces and value of gold and silver coinage of the United States, by calendar years, from 1873 to 1897:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE UNITED STATES, 1873–1897.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	2,758,475	$57,022,748	3,112,891	$4,024,748
1874	1,705,441	35,254,630	5,299,421	6,851,777
1875	1,594,050	32,951,940	11,870,635	15,347,893
1876	2,253,281	46,579,453	18,951,777	24,503,308
1877	2,128,493	43,999,864	21,960,246	28,393,045
1878	2,408,400	49,786,052	22,057,548	28,518,850
1879	1,890,499	39,080,080	21,323,498	27,569,776
1880	3,014,163	62,308,279	21,201,232	27,411,694
1881	4,685,162	96,850,890	21,609,970	27,940,164
1882	3,187,317	65,887,685	21,635,469	27,973,132
1883	1,414,581	29,241,990	22,620,701	29,246,968
1884	1,160,601	23,991,756	22,069,935	28,534,866
1885	1,343,519	27,773,012	22,400,433	28,962,176
1886	1,400,240	28,945,542	24,817,064	32,086,709
1887	1,159,664	23,972,383	27,218,101	35,191,081
1888	1,518,046	31,380,808	25,543,242	33,025,606
1889	1,035,899	21,413,931	27,454,465	35,496,683
1890	990,100	20,467,182	30,320,999	39,202,908
1891	1,413,614	29,222,005	21,284,115	27,518,857
1892	1,682,832	34,787,223	9,777,084	12,641,078
1893	2,757,231	56,997,020	6,808,413	8,802,797
1894	3,848,045	79,546,160	7,115,896	9,200,351
1895	2,883,941	59,616,358	4,407,055	5,698,010
1896	2,276,192	47,053,060	17,858,594	23,089,899
1897	3,677,878	76,028,485	14,298,769	18,487,297
Total	54,187,664	1,120,158,536	453,017,558	585,719,673

In the Appendix a table will be found showing the value of the coinage executed by each mint from 1792 to 1897 inclusive.

The following table shows the number of pieces and value of coinage executed at the mints of the United States during the calendar year 1897:

COINAGE EXECUTED IN THE UNITED STATES, CALENDAR YEAR 1897.

Description.	Pieces.	Value.
Gold	5,382,707	$76,028,485.00
Silver dollars (act July 14, 1890)	12,651,731	12,651,731.00
Subsidiary silver coins	27,022,499	5,835,566.30
Minor coins	70,895,065	1,526,100.05
Total	115,952,002	96,041,882.35

BARS MANUFACTURED, 1897.

The following table shows the character and value of gold and silver bars manufactured during the calendar year 1897:

Description.	Gold.	Silver.
Fine bars	$32,821,988.96	$7,110,419.05
Mint bars	5,510,983.49	112,899.08
Standard bars	47,983.83	.....
Unparted bars	11,041,897.62	129,176.20
Total	49,422,853.90	7,352,494.33

PURCHASE OF SILVER.

Since November 1, 1893, the date of the repeal of the purchasing clause of the act of July 14, 1890, the purchase of silver bullion by the Government has been limited to the silver contained in gold deposits, the small fractions of silver for return in fine bars, the amount retained in payment of charges, surplus silver bullion returned by the operative officers of the mints at the annual settlement, and mutilated domestic silver coins purchased for the subsidiary silver coinage under the provisions of section 3526 of the Revised Statutes.

TABLE SHOWING QUANTITY OF SILVER PURCHASED AND COST OF SAME FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1897.

Stock.	Fine ounces.	Cost.
Partings, charges, and fractions purchased	256,064.81	$157,618.28
Mutilated coins, including melted assay coins, purchased	3,761.99	2,852.61
Surplus bullion purchased	11,122.73	7,295.95
Total	270,949.53	167,766.84

TABLE SHOWING THE QUANTITY AND COST OF SILVER PURCHASED AT EACH MINT FOR THE SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1897.

Mint.	Fine ounces.	Cost.
Philadelphia	204,755.95	$128,419.42
San Francisco	58,203.01	34,665.10
New Orleans	6,014.62	3,512.14
Carson	1,975.95	1,170.18
Total	270,949.53	167,766.84

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACT OF FEBRUARY 28, 1878.

Fiscal year.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1878	10,809,350.58	$13,023,268.96	$1.2048	$0.9318
1879	19,248,086.00	21,593,642.99	1.1218	.8676
1880	22,057,862.64	25,235,081.53	1.1440	.8848
1881	19,709,227.11	22,327,874.75	1.1328	.8761
1882	21,190,200.87	24,054,480.47	1.1351	.8779
1883	22,889,241.24	25,577,327.58	1.1174	.8642
1884	21,922,951.52	24,378,383.91	1.1120	.8600
1885	21,791,171.61	23,747,460.25	1.0897	.8428
1886	22,690,652.94	23,448,960.01	1.0334	.7992
1887	26,490,008.04	25,988,620.46	.9810	.7587
1888	25,386,125.32	24,237,553.20	.9547	.7384
1889	26,468,861.03	24,717,853.81	.9338	.7222
1890	27,820,900.05	26,899,326.33	.9668	.7477
1891	2,797,379.52	3,049,426.46	1.0901	.8431
Total	291,272,018.56	308,279,260.71	1.0583	.8185

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACT OF JULY 14, 1890.

Fiscal years.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1891	48,393,113.05	$50,577,498.44	$1.0451	$0.8083
1892	54,355,748.10	51,106,607.96	.9402	.7271
1893	54,008,162.60	45,531,374.53	.8430	.6520
1894	11,917,658.78	8,715,521.32	.7313	.5656
Total	168,674,682.53	155,931,002.25	.9244	.7150

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACTS OF FEBRUARY 12, 1873, JANUARY 14, 1875, FEBRUARY 28, 1878, AND JULY 14, 1890.

Act authorizing.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
February 12, 1873	5,434,282.00	$7,152,564.00	$1.3162	$1.0180
January 14, 1875	31,603,906.00	37,571,148.00	1.1888	.9194
February 28, 1878	291,272,018.56	308,279,260.71	1.0583	.8185
July 14, 1890	168,674,682.53	155,931,002.25	.9244	.7150
Total	496,984,889.09	508,933,974.96	1.0240	.7920

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, NUMBER OF DOLLARS COINED, AND SEIGNIORAGE ON SAME, FROM AUGUST 13, 1890, TO JANUARY 1, 1898.

Disposition.	Fine ounces.	Cost.
Total amount purchased, and cost	168,674,682.53	$155,931,002.25
Used in coinage to January 1, 1898	56,130,569.09	54,162,529.11
Wasted and sold in sweeps	63,570.37	62,535.64
Total amount used	56,194,139.46	54,225,064.75
Balance January 1, 1898	112,480,543.07	101,705,937.50
Total	168,674,682.53	155,931,002.25
Silver dollars coined		72,572,857.00
Seigniorage on same		18,410,327.89

BALANCE OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, ON HAND AT EACH MINT JANUARY 1, 1898.

Mint.	Fine ounces.	Cost.
Philadelphia	108,997,051.82	$98,655,933.34
San Francisco	2,497,978.02	2,236,770.29
New Orleans	417,531.76	358,522.92
Carson	567,981.47	454,710.95
Total	112,480,543.07	101,705,937.50

IMPORTS AND EXPORTS OF GOLD AND SILVER.

IMPORTS OF GOLD.—The total value of gold imports during the calendar year 1897 was $34,056,055.

Foreign gold bullion of the value of $5,614,367 was imported into the United States during the calendar year 1897, of which amount $2,588,619 came from Mexico, $905,342 from Australasia, $761,131 from Canada, $498,790 from Italy, $265,623 from Colombia, and the remainder from various countries.

Foreign gold coin of the value of $14,027,199 was imported; $9,855,336 came from Australasia, $2,415,913 from Cuba, $896,351 from England, $326,736 from Venezuela, and the remainder from various countries, principally from Canada and South America.

Foreign gold ores of the value of $600,073 was imported, of which $582,083 came from Mexico, and the balance from Canada and Central and South America.

Gold contained in base bullion of the value of $1,133,816 was imported, $860,438 of which was from Mexico.

Silver-lead ore of the value of $3,480,108 was imported from British Columbia and Mexico.

Gold coin of the United States, of the value of $9,200,492 was returned to this country. England shipped $4,461,934 of this amount, while France returned $2,500,000; Canada, $518,931; Haiti, $418,610; Cuba, $381,593; Venezuela, $256,173, and the balance from various countries of the world.

The following table shows the total gold imports for the year:

GOLD IMPORTS, CALENDAR YEAR 1897.

Items.	Amounts.
Foreign bullion	85,614,367
Foreign coin	14,027,199
In foreign base bullion	1,133,816
In foreign silver-lead ore	3,450,108
In foreign gold ore	600,073
Total foreign	24,855,563
United States coin	9,200,492
Total gold imports	34,056,055

GOLD EXPORTS.—The total value of gold exports, consisting of domestic and foreign material, amounted to $34,568,664.

The value of gold bars manufactured by the United States Government institutions, exported, was $11,636,684, France receiving $10,657,024 and Germany $979,660.

The value of other domestic bars not manufactured by the Government, exported, was $622,609, of which $337,387 was shipped to England, $204,454 to France, $77,807 to Quebec, and the balance to Nova Scotia, British Columbia, and Hongkong.

United States gold coin of the value of $21,198,070 was exported, $11,210,000 going to Germany, $4,000,000 to France, $2,327,197 to Quebec, $1,155,140 to Hawaii, and the balance to various countries.

The value of gold contained in base bullion exported was $371,039, which went to Germany, England, France, and the Netherlands, while gold ore valued at $190 was shipped to Nova Scotia.

Foreign gold bullion valued at $13,877 was also exported to France and Quebec.

Foreign gold coin valued at $692,942 was exported, $521,995 of which went to France, $70,000 to Germany, $55,186 to Venezuela, $38,215 to Quebec, and the balance to various countries.

The value of gold contained in foreign base bullion exported was $33,243, which went to England.

The following table shows the total gold exports during the year:

GOLD EXPORTS, CALENDAR YEAR 1897.

Items.	Amount.
United States bars	$11,636,684
Other bullion	622,609
United States coin	21,198,070
In base bullion, pig copper, and copper matte	371,039
In gold ore	190
Total domestic	33,828,592
Foreign bullion reexported	13,877
Foreign coin reexported	692,942
In foreign base bullion	33,243
In foreign gold ore	10
Total foreign	740,072
Total gold exports	34,568,664

SILVER IMPORTS.—The total value of the silver imports during the calendar year 1897 was $33,180,463.

Foreign silver bullion of the commercial value of $2,846,327 was imported, of which $2,494,770 came from Mexico, $349,355 from Honduras, and the balance from Central and South America.

Foreign coin of the value of $8,639,302 was imported, $7,196,155 of which came from Mexico, $483,954 from Santo Domingo, $280,651 from British Honduras, and the remainder from various countries.

United States silver coin of the value of $169,050 was returned to this country, $81,449 of which was returned by Canada, $44,000 by San Salvador, and the remainder from various countries.

The invoiced value of silver contained in base bullion was $13,369,953, and in silver-lead ore $7,723,223, the greater part of which amounts came from Mexico and British Columbia.

Silver ore valued at $432,608 was imported; $167,219 came from Mexico and the balance from Central and South America.

The base bullion, silver-lead ore, copper regulus, and lead bullion, imported principally from Mexico and British Columbia, contained 240,565 ounces of gold, valued at $4,613,924; 24,833,743 ounces of silver, of the value of $21,093,176; 81,056,179 pounds of lead, valued at $1,395,665, and 14,286,553 pounds of copper, valued at $1,157,867, as shown by custom-house returns to this Bureau.

The following table is presented, showing the quantity and value of metals contained in the importations of base bullion referred to above:

IMPORTS OF BASE BULLION, COPPER REGULUS, AND SILVER-LEAD ORE INTO THE UNITED STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897, AND THEIR METALLIC CONTENTS.

Country and customs district.	Weight and value of lead bullion, copper regulus, base bullion, and silver-lead ore imported.							
	Lead bullion.		Copper regulus.		Base bullion.		Silver-lead ore.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
From Mexico:								
Arizona	418	$3,036	2,035,594	$137,505	.....	.....	12,144,065	$913,888
Corpus Christi	381,677	28,490	2,331,279	326,003	1,668,196	$173,928	3,200,000	57,019
Galveston	915,694	48,312	1,640,440	205,622	433,337	22,165	.....	.....
Paso del Norte	1,569	26	.....	.....	150,532	1,450	215,549,431	3,496,822
Pittsburg	.....	.....	.....	.....	3,523,110	432,961	.....	.....
Saluria	1,275,592	72,528	.....	.....	7,229,763	709,268	1,321,693	7,038
San Francisco	.....	.....	.....	.....	.....	.....	11,296,605	754,490
New York	.....	.....	.....	.....	(a)	12,196,878	(a)	.....
	2,574,950	152,392	6,007,313	669,130	13,004,938	13,536,650	243,511,794	5,229,258
From British Columbia:								
Kansas City	.....	.....	4,602,092	515,427	.....	.....	1,560,664	53,471
Minnesota	.....	.....	.....	.....	.....	.....	80,000	7,550
Montana and Idaho	.....	.....	.....	.....	.....	.....	5,910,494	172,130
Omaha	.....	.....	.....	.....	.....	.....	19,171,800	1,041,208
Puget Sound	.....	.....	565,018	281,024	.....	.....	97,694,220	6,099,478
Detroit	.....	.....	.....	.....	(a)	90	(a)	25
New York	.....	.....	.....	.....	(a)	121,566	.....	.....
	.....	.....	5,167,110	796,451	.....	121,656	124,417,178	7,373,862
From England	.....	.....	.....	.....	(a)	5,620	.....	.....
From Honduras	.....	.....	.....	.....	(a)	107,769	(a)	21,029
From Peru	.....	.....	.....	.....	(a)	100,431	(a)	75,796
From Chile	.....	.....	.....	.....	.....	.....	(a)	62,281
From Salvador	.....	.....	.....	.....	.....	.....	(a)	100
From Colombia	.....	.....	.....	.....	.....	.....	(a)	6,427
From Nova Scotia	.....	.....	.....	.....	.....	.....	(a)	1,780
	.....	.....	.....	.....	(a)	213,820	(a)	167,413
Total	2,574,950	152,392	11,174,423	1,465,581	13,004,938	13,872,126	367,928,972	12,770,533

a No information furnished.

IMPORTS OF BASE BULLION, COPPER REGULUS, AND SILVER-LEAD ORE INTO THE UNITED STATES DURING THE CALENDAR YEAR, ETC.—Continued.

Country and customs district.	Metallic contents of the importation.							
	Gold.		Silver.		Lead.		Copper.	
	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.
From Mexico:								
Arizona	3,035	$60,700	1,413,108	$833,660	1,344,828	$15,348	2,160,219	$144,721
Corpus Christi	2,035	41,992	561,629	319,082	1,351,180	32,036	2,971,420	192,330
Galveston	1,609	33,243	149,691	95,489	1,350,843	32,035	1,626,010	115,332
Paso del Norte	22,945	250,189	5,080,292	2,963,327	16,570,079	247,330	408,367	37,453
Pittsburg	.....	.....	548,115	404,817	3,485,729	28,144	.....	.....
Saluria	12,473	228,505	1,000,140	493,614	9,527,064	66,715	.....	.....
San Francisco	10,042	207,563	844,744	504,557	1,738,395	42,370	.....	.....
New York	26,922	556,261	9,017,378	11,640,617	(a)	(a)	(a)	(a)
	79,061	1,378,453	18,615,097	17,255,163	35,368,118	463,978	7,166,016	489,836
From British Columbia:								
Kansas City	6,018	120,366	480,127	282,853	1,290,897	41,126	1,740,937	124,553
Minnesota	.....	.....	11,000	6,320	32,000	1,230	.....	.....
Montana and Idaho	23	461	192,981	112,838	3,043,541	58,831	.....	.....
Omaha	56	1,105	1,259,860	813,422	9,069,185	200,270	377,275	26,411
Puget Sound	147,990	2,959,960	3,889,986	2,273,245	32,252,438	630,230	5,002,325	517,067
Detroit	.....	.....	151	115	.....	.....	.....	.....
New York	5,667	117,420	3,207	4,146	(a)	(a)	(a)	(a)
	159,754	3,199,312	5,837,312	3,492,939	45,688,061	931,687	7,120,537	668,031
From England	247	5,099	403	521	.....	.....	.....	.....
From Honduras	1,503	31,060	75,594	97,738	.....	.....	.....	.....
From Peru	.....	.....	146,175	176,227	.....	.....	.....	.....
From Chile	.....	.....	143,504	62,281	.....	.....	.....	.....
From Salvador	.....	.....	78	100	.....	.....	.....	.....
From Colombia	.....	.....	14,806	6,427	.....	.....	.....	.....
From Nova Scotia	.....	.....	774	1,780	.....	.....	.....	.....
	1,750	36,159	381,334	345,074	.....	.....	.....	.....
Total	240,565	4,613,924	24,833,743	21,093,176	81,056,179	1,395,665	14,286,553	1,157,867

a No information furnished.

The following table shows the total silver imports for the year:

SILVER IMPORTS, CALENDAR YEAR 1897.

Items.	Amount.
Foreign bullion (commercial value)	$2,846,327
Foreign coin	8,639,302
Foreign ore (commercial value)	432,608
In foreign base bullion	13,369,953
In foreign silver-lead ore	7,723,223
Total foreign	33,011,413
United States coin	169,050
Total silver imports	33,180,463

SILVER EXPORTS.—The total value of silver exports, consisting of domestic and foreign material, amounted to $59,468,075.

Domestic silver bars manufactured by the United States Government of the value of $568,577 were exported; $504,440 of which went to Japan, $55,700 to England, $8,100 to Hongkong, and $337 to Quebec. Other silver bars made in the United States of the value of $50,107,970 were exported; $44,213,170 went to England, $1,850,624 went to Hongkong, $1,471,988 to British East Indies, $940,000 to France, $877,290 to China, $714,980 to Japan, and the remainder to various countries.

Base bullion and silver ore of the value of $1,020,967 was exported, nearly all of which went to England. Silver coin of the United States of the value of $114,903 was exported; $87,700 went to Hawaii, $18,936 to British Columbia, and the remainder went to the West Indies and Canada.

Foreign silver bullion valued at $6,583 was exported to Quebec, and foreign silver coins of various nations received in the United States of the value of $7,553,586 were exported; $4,809,286 going to Hongkong, $1,130,830 to England, and the remainder to various countries.

Silver contained in foreign base bullion of the value of $95,489 was exported to England:

SILVER EXPORTS, CALENDAR YEAR 1897.

Items.	Amount.
United States bars	$568,577
Other bullion	50,107,970
United States coin	114,903
In base bullion, pig copper, copper matte, etc	1,020,967
In silver ore	600
Total domestic	51,812,417
Foreign bullion reexported	6,583
Foreign coin reexported	7,553,586
In foreign base bullion	95,489
Total foreign	7,655,658
Total silver exports	59,468,075

In the above tables, the items "exported in base bullion, in pig copper, copper matte, etc., gold $371,039; silver $1,020,367," ascertained by the Bureau of the Mint from exporters, has been substituted for the amounts reported to the Bureau by the collectors of customs, for reasons stated in the following letters from collectors of customs at the ports of New York and Baltimore:

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of New York, March 18, 1898.

SIR: In reply to your letter of the 14th instant, asking for the amount of gold and silver contained in pig copper, copper matte, etc., exported from this port during the calendar year ending December 31, 1897, I would state that the exports of copper matte during that year amounted to 7,001 tons of 2,240 pounds each. The gold and silver contained therein are as follows: Gold, 2,053 ounces; silver, 967,716 ounces.

In relation to pig copper it is usually exported subject to the assay made at the port of destination, making the information as to the quantity of gold and silver contained therein unavailable at this port.

Respectfully, yours,

G. R. BIDWELL, *Collector.*

DIRECTOR OF THE MINT,
Washington, D. C.

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of Baltimore, Md., March 16, 1898.

SIR: In compliance with your request of the 14th instant, I have the honor to inclose herewith a statement of the amount of gold and silver contained in copper matte exported from this port during the calendar year ended December 31, 1897.

The records of this office do not indicate that there was any pig copper, or other ore containing gold and silver, exported during the above-mentioned period.

Respectfully, yours,

JAMES A. DIFFENBAUGH,
Special Deputy Collector.

DIRECTOR OF THE MINT,
Washington, D. C.

STATEMENT OF THE AMOUNT OF GOLD AND SILVER CONTAINED IN COPPER MATTE EXPORTED FROM THE PORT OF BALTIMORE, MD., DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897, CALCULATED ON A BASIS OF 60.5 PER CENT PURE COPPER, 35 OUNCES PURE SILVER, AND 0.14 OUNCE PURE GOLD.

Month.	Matte.		Pure copper.	Pure silver.	Pure gold.
	Pounds.	*Tons.*	*Pounds.*	*Ounces.*	*Ounces.*
November, 1897	142,240	63.5	86,055	2,222.5	8.89

In the Appendix will be found tables exhibiting the imports and exports of the precious metals, by customs districts and by countries, for the calendar year 1897.

MOVEMENT OF GOLD FROM THE UNITED STATES.

The superintendent of the United States assay office at New York has kindly prepared the following tables, giving exports of gold through the port of New York during the calendar year 1897:

STATEMENT OF UNITED STATES GOLD COIN AND GOLD BULLION EXPORTED FROM THE PORT OF NEW YORK TO EUROPE DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

Date.	Country.	Value.	Rate of pound sterling exchange.	Date.	Country.	Value.	Rate of pound sterling exchange.
April 20	Germany	$979,660	$4.88	June 25	France	$2,306,333	$4.87½
April 28	do	1,000,000	4.87¾		England	30,700	4.87½
April 30	England	500,000	4.87½	July 19	do	7,000	4.87¼
	France	4,037,331	4.87½	July 23	France	801,000	4.87¼
May 3	Germany	1,500,000	4.87½	July 26	Germany	502,750	4.87¼
May 7	France	1,018,458	4.87½	July 28	England	3,000	4.87¼
May 12	Germany	500,000	4.87½	July 30	France	3,207,535	4.87¼
May 14	France	2,290,167	4.87½	August 2	Germany	750,000	4.87¼
May 21	do	1,201,654	4.87½	August 9	England	29,600	4.86
May 24	Germany	2,350,000	4.87¼	September 3	do	17,600	4.86¼
May 26	do	500,000	4.87¼	October 9	do	65,098	4.84¾
June 2	do	650,000	4.87¼		Germany	1,480	4.84¾
June 4	do	500,000	4.87	November 3	England	138,861	4.85½
June 11	do	260,000	4.87	December 6	do	46,926	4.85¾
June 16	do	600,000	4.87		Germany	3,060	4.85¾
June 18	do	350,000	4.87¼		Total	28,648,213	.....
June 21	do	1,350,000	4.87½				
June 23	do	1,150,000	4.87½				

RECAPITULATION OF GOLD EXPORTS.

Description.	England.	Germany.	France.
United States coin	$500,000	$11,960,000	4,000,000
Bars (United States Assay Office at New York)	.....	978,677	10,644,417
Foreign coins	.....	70,000	521,995
Bullion (unknown)	338,785	8,273	218,061
Total	838,785	13,016,950	15,384,473

Grand total shipments to Europe, $29,240,208.

During the same period there were shipped to Mexico, West Indies, Central and South America, the following:

United States coin	$882,134
Foreign coins	86,230
Total	968,364
Grand total	30,208,572

THE MARKET FOR SILVER DURING THE CALENDAR YEAR 1897.

The London price of standard silver in 1897 never exceeded its minimum price in 1896 ($29\frac{13}{16}$d.), except in January, when it reached $29\frac{13}{16}$d. This price, at the beginning of the year, was the highest. The lowest price of the year was $23\frac{5}{8}$d., and the average price, based on daily quotations, $27\frac{9}{16}$d. This lowest price was reached in September. After January there was a steady decline in the average price of the year until September, when there was a slight advance, followed in October by another, and by a small decline in November and December, the year closing at the average monthly price of 26.805d. The gradual decline after January and until the end of July was caused, in part, it is claimed, by the adoption by Japan of the gold standard. The causes of the decline early in August, continuing until September 1, when the lowest figure of the year ($23\frac{5}{8}$d.) was reached, are obscure and difficult to trace.

On September 3 the India council announced the discontinuation, for three or four months, of their drafts on India. This announcement was followed immediately by a rapid rise in the price of silver, which went to $25\frac{1}{2}$d. on the 11th, after which there were abrupt rises and falls of the price until the 7th of December, when the India council recommenced to sell drafts on India and the market for silver became steadier, the price per standard ounce ranging between 26 and $26\frac{3}{8}$d.

India purchased considerably more silver in 1897 than in 1896.

The following table shows the price of standard silver in 1897 in London, and the equivalent value of an ounce, fine, at the average monthly price and the average rate of exchange:

HIGHEST, LOWEST, AND AVERAGE PRICE OF SILVER BULLION AND VALUE OF A FINE OUNCE EACH MONTH DURING THE CALENDAR YEAR 1897.

Month.	Highest.	Lowest.	Average price per ounce, British standard, 0.925.	Equivalent value of a fine ounce, with exchange at par ($4.8665).	Average monthly price at New York of exchange on London.	Equivalent value of a fine ounce, based on average monthly price and average rate of exchange.	Average monthly New York price of fine bar silver.
1897.	*Pence.*	*Pence.*	*Pence.*				
January	$29\frac{13}{16}$	$29\frac{11}{16}$	29.7275	$0.65166	$4.8717	$0.65235	$0.65975
February	$29\frac{3}{4}$	$29\frac{11}{16}$	29.7119	.65131	4.8690	.65169	.65931
March	$29\frac{5}{8}$	$28\frac{5}{16}$	28.9647	.63494	4.8730	.63577	.64231
April	$28\frac{1}{8}$	$28\frac{3}{16}$	28.3726	.62105	4.8766	.62323	.62950
May	$28\frac{3}{16}$	$27\frac{1}{8}$	27.7750	.60886	4.8734	.61010	.61590
June	$27\frac{3}{4}$	$27\frac{1}{8}$	27.5817	.60462	4.8725	.60536	.61129
July	$27\frac{11}{16}$	$26\frac{3}{8}$	27.3503	.59955	4.8725	.60024	.60639
August	$26\frac{5}{8}$	$23\frac{3}{4}$	24.9567	.54708	4.8506	.54625	.55394
September	$27\frac{3}{8}$	$23\frac{5}{8}$	25.6500	.56453	4.8544	.56082	.56890
October	$27\frac{1}{8}$	$25\frac{9}{16}$	27.1418	.59498	4.8485	.58435	.58812
November	$27\frac{1}{8}$	26	26.8125	.58776	4.8566	.58646	.56785
December	$27\frac{3}{4}$	$25\frac{15}{16}$	26.8050	.58759	4.8520	.58588	.58971
Average	.....	.....	27.5708	.60449	4.8649	.60354	.60774

The world's production of silver in 1897 was, in round numbers, 183,126,500 ounces fine. The imports of silver bullion into Great Britain in 1897 amounted to 98,888,210 standard ounces (.925 fine), equivalent to 91,471,494 fine ounces. It would thus appear that just about one-half of the total quantity of silver produced in the year, in all countries, went to the world's great silver market, London, whence it was distributed among the various other countries according to their demands for it. Great Britain, however, exported, in 1897, 2,128,675 ounces standard more than it imported. This last amount was doubtless from the stock on hand in the London market carried over from 1896. It can not have been British production, for Great Britain produces not more than some 300 ounces a year.

The total export of silver bullion of Great Britain to all countries in 1897 was 101,010,885 ounces, British standard, or, in round numbers, 93,435,068 ounces fine; that is, 1,873,574 ounces fine more than in 1896, a fact which is not a matter of surprise, as the world's silver product, due most largely to the increased yield in Mexico and Peru, was greater in 1897 than in 1896 by 14,948,000 ounces.

The following table shows the imports and exports of silver bullion in ounces, British standard, into and from Great Britain in the calendar year 1897, as well as the countries from which the metal was imported and to which exported:

GREAT BRITAIN'S IMPORTS AND EXPORTS OF SILVER BULLION FOR THE YEAR 1897.

Country.	1897.	
	Imports.	Exports.
	Ounces.	*Ounces.*
Russia	.....	15,929,362
Germany	1,765,800	6,023,272
Holland	.....	89,648
Belgium	772,384	13,853,987
France	3,087,073	7,709,801
Portugal, Azores and Madeira	.....	298,308
Spain and Canaries	217,312	6,836,612
Turkey	.....	.....
Egypt	34,502	260,451
West coast of Africa	850	.....
China (including Hongkong)	95,000	1,320,948
United States of America	79,219,676	.....
Mexico, Central and South America (except Brazil and West Indies)	13,172,379	.....
Brazil	7,694	864
Gibraltar	727	.....
Malta	.....	7,544
British Possessions in South Africa	7,122	90,697
British East Indies	.....	48,101,894
Australasia	505,729	.....
British North America	202	.....
Austrian territories	.....	32,000
Japan	.....	325,121
Other countries	1,760	130,376
Total:		
Quantity	98,888,210	101,010,885
Value	$55,189,351	$59,741,465

It appears from the above table that the principal purchasers of silver bullion in 1897 were India, Russia, Belgium, and France. According to the annual statement of the trade of the United Kingdom, London exported to India in 1897, 13,548,138 ounces standard more than in 1896, the cause of which doubtless was the discontinuance by the Indian council for several months of the sale of council bills. The exports to Russia are accounted for by that country's large coinage of silver in 1897. The exports to Belgium and France may possibly be also explained at least in part by the coinage of silver made by these countries in 1897 for Russia, the former having coined 26,000,000 rubles for that country and the latter 46,755,438 50-copec pieces.

The exports of silver bullion from England to the various countries do not necessarily correspond with the total imports of silver bullion into the latter, respectively, for they may have obtained some from other countries.

The head of the agency of the ministry of finances of Russia attached to the Russia legation in Washington, Mr. M. de Routkowsky, informs the Bureau that Russia purchased fine silver to the amount of 12,796,551 ounces in the first half of 1897 and 12,024,447 ounces in the second half, a total in the year of 24,820,998, equivalent to 26,941,619 ounces British standard, or 11,012,257 ounces more than was exported to it from England. Russia's object in coining so much silver is to help carry out its monetary reform in the direction of the gold standard by redeeming its paper roubles or bills of credit, which may be exchanged rouble for rouble in silver or gold.

Exclusive of the amount exported to Great Britain, the United States shipped to foreign countries, in 1897, 10,817,467 ounces of fine silver bullion (domestic and foreign), as follows: To Hongkong, 3,131,349 ounces; to British India, 2,575,192 ounces; to China, 1,482,371 ounces; to Japan, 1,146,335 ounces; to France, 1,522,914 ounces, and smaller amounts to other countries.

In this connection it is not without interest to compare the amounts of the net imports of silver into India during the six years preceding and the five succeeding the closing of the Indian mints in June, 1893. The following figures are for the fiscal years ended March 31. The net imports were as follows:

Year.	Ounces.	Year.	Ounces.
1887-88	32,782,799	1893-94	54,328,073
1888-89	32,436,029	1894-95	27,040,022
1889-90	38,643,774	1895-96	27,018,079
1890-91	51,529,085	1896-97	25,929,088
1891-92	32,348,438	1897-98	44,284,995
1892-93	45,523,973		

STOCK OF MONEY IN THE UNITED STATES.

The stock of United States coin in the United States on January 1, 1898, was as follows:

OFFICIAL TABLE OF STOCK OF UNITED STATES COIN IN THE UNITED STATES JANUARY 1, 1898.

Items.	Gold.	Silver.	Total.
Estimated stock of coin January 1, 1897	$638, 186, 705	$518, 921, 607	$1, 157, 108, 312
Coinage, calendar year 1897	76, 028, 485	18, 487, 297	94, 515, 782
Net imports of United States coin, calendar year 1897	.....	54, 147	54, 147
Total	714, 215, 190	537, 463, 051	1, 251, 678, 241
Loss:			
Net exports of United States coin, calendar year 1897	11, 997, 578	.....	11, 997, 578
United States coin melted for recoinage, calendar year 1897	750, 688	5, 811, 833	6, 562, 521
United States coin used in the arts, calendar year 1897 (estimated)	1, 500, 000	100, 000	1, 600, 000
Total	14, 248, 266	5, 911, 833	20, 160, 099
Estimated stock of coin January 1, 1898	699, 966, 924	531, 551, 218	1, 231, 518, 142

NOTE.—Of the silver coins, $455,818,122 were in dollars and $75,733,096 were in subsidiary coins.

In the above table the item, "United States coin melted for recoinage," the amounts represent nominal or face value.

In the Appendix a table will be found giving in detail the source from which these amounts were obtained.

The following table gives the value of the gold and silver bullion owned by the Government on January 1, 1898:

GOLD AND SILVER BULLION IN MINTS AND ASSAY OFFICES JANUARY 1, 1898.

Metal.	Cost value.
Gold	$45, 279, 029
Silver	103, 552, 032
Total	148, 831, 061

There were 355,045 fine ounces of silver bullion on deposit at the Mercantile Safe Deposit Company, in New York City, on January 1, 1898, valued at $206,814.

The United States had a total metallic stock on hand January 1, 1898, including the amount held by the Mercantile Safe Deposit Company, as follows:

METALLIC STOCK, JANUARY 1, 1898.

Coin and bullion.	Amount.
Gold	$745, 245, 953
Silver (bullion in mints and held by Mercantile Safe Deposit Co.)	635, 310, 064
Total	1, 380, 556, 017

The total metallic stock on hand on January 1, 1897, was as follows:

METALLIC STOCK, JANUARY 1, 1897.

Coin and bullion.	Amount.
Gold	$692,835,448
Silver (bullion in mints and held by Mercantile Safe Deposit Co.)	631,497,885
Total	1,324,333,333

A comparison of the above tables will show that the stock of gold increased $52,410,505 and silver $3,812,179, a total increase of $56,222,684 during the calendar year.

The location of the stock of metallic and paper money in the United States on January 1, 1898, was as follows:

LOCATION OF THE MONEYS OF THE UNITED STATES, JANUARY 1, 1898.

Moneys.	In Treasury.	Outside of Treasury.	Total.
Metallic:			
Gold bullion	$45,279,029		$45,279,029
Silver bullion	103,552,032	$206,814	103,758,846
Gold coin	152,488,113	547,478,811	699,966,924
Silver dollars	394,592,581	61,225,541	455,818,122
Subsidiary silver coin	10,746,763	64,986,333	75,733,096
Total	706,658,518	673,897,499	1,380,556,017
Paper:			
Legal-tender notes, old issue	84,527,133	262,153,883	346,681,016
Legal-tender notes, act July 14, 1890	3,005,848	103,342,432	106,348,280
Gold certificates	1,571,300	36,556,849	38,128,149
Silver certificates	11,361,016	376,564,488	387,925,504
National-bank notes	5,197,259	223,817,382	229,014,641
Currency certificates	1,240,000	43,685,000	44,925,000
Total	106,902,556	1,046,120,034	1,153,022,590
Grand total	813,561,074	1,720,017,533	2,533,578,607

The amount of metallic money in circulation increased $37,366,042 and the amount of paper money $35,335,740 during the year, showing a total increased circulation of $72,701,782 on January 1, 1898.

GOLD AND SILVER USED IN THE INDUSTRIAL ARTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1897.

By requesting returns from all the private refineries and Government institutions, as in former years, this Bureau has ascertained the amount of gold and silver used in the industrial arts in the United States during the calendar year 1897.

In compliance with these requests, statements showing the number of fine ounces, and value of gold and silver bars sold to manufacturers and jewelers for industrial purposes, and also the class of material used in the manufacture of such bars have been received.

The following table from the United States assay office at New York is submitted.

The weight and value of gold and silver bars furnished manufacturers and jewelers by the United States assay office at New York during the calendar year 1897 was as follows:

BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	297,628.184	$6,152,520.59	4,272,505.70	$5,524,047.77
Foreign material	29,701.301	613,980.38	616,578.77	797,192.75
Old jewelry, etc	83,358.644	1,723,176.11	373,548.49	482,971.78
Total	410,688.129	8,489,677.08	5,262,632.96	6,804,212.30

The following table from the United States mint at Philadelphia is submitted:

VALUE AND COMPOSITION OF BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES MINT AT PHILADELPHIA DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	27,415.825	$566,735.35	2,009.42	$2,598.04
United States coin	572.104	11,826.45	.....	.....
Jewelry, etc	3,862.266	79,840.15	50,129.58	64,814.00
Total	31,850.195	658,401.95	52,139.00	67,412.04

The following table was compiled from returns from all the private refineries in the United States:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1897.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion (exclusive of United States bars)	22,522	$465,566	2,841,494	$3,673,851
United States bars	95,237	1,968,744	812,387	1,050,359
United States coin	8,709	180,028	.....	.....
Old plate, jewelry, and other old material	37,172	768,412	429,779	555,674
Total	163,640	3,382,750	4,083,660	5,279,884

Number of firms addressed 48
Number of firms replying 43
Number of firms manufacturing 26
Number of firms not manufacturing 17

The United States Mint or assay office bars are included in the above table, and in order to avoid duplication they must be eliminated from the amounts reported by private refineries.

The following table, with the United States Mint or assay office bars eliminated, is submitted:

BARS FOR INDUSTRIAL USE (EXCLUSIVE OF GOVERNMENT BARS) FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1897.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	22,522	$465,566	2,841,494	$3,673,851
United States coin	8,709	180,028	.....	.....
Old plate, jewelry, and other old material	37,172	768,412	429,779	555,674
Total	68,403	1,414,006	3,271,273	4,229,525

The following table was compiled from returns from Government institutions and private refineries:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS DURING THE CALENDAR YEAR 1897, AND CLASSIFICATION OF THE MATERIAL USED.

Material used.	Gold.	Silver (coining value).	Total.
Domestic bullion	$7,184,822	$9,200,497	$16,385,319
United States coin	191,854	.....	191,854
Old material	2,571,428	1,103,460	3,674,888
Foreign bullion and coin	613,981	797,193	1,411,174
Total	10,562,085	11,101,150	21,663,235

The actual amount of United States coin melted by goldsmiths and jewelers would not appear in the reports from institutions manufacturing bars, and, in fact, is not known, but assuming the total amount of such coin used in the arts to be, as in former years, gold $1,500,000, silver $100,000, the following table shows the industrial consumption of the precious metals in the United States during the calendar year 1897:

INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS DURING THE CALENDAR YEAR 1897.

Material used.	Gold.	Silver (coining value).	Total.
Domestic bullion	$7,184,822	$9,200,497	$16,385,319
United States coin	1,500,000	100,000	1,600,000
Old material	2,571,428	1,103,460	3,674,888
Foreign bullion and coin	613,981	797,193	1,411,174
Total	11,870,231	11,201,150	23,071,381

GOLD BARS EXCHANGED FOR GOLD COIN AT THE MINT AT PHILADELPHIA AND ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR 1897.

Month.	Philadelphia.	New York.	Total.
January	$35,143.34	$314,302.14	$349,445.48
February	55,233.21	356,573.06	411,806.27
March	55,228.42	374,238.88	429,467.30
April	35,172.86	3,681,996.75	3,717,169.61
May	45,199.59	4,785,283.71	4,830,483.30
June	50,323.37	2,672,191.35	2,722,514.72
July	35,149.12	1,892,509.24	1,927,658.36
August	40,184.68	575,957.40	616,142.08
September	45,100.76	869,575.77	914,676.53
October	60,000.00	866,994.72	926,994.72
November	60,000.00	700,437.13	760,437.13
December	50,000.00	467,372.77	517,372.77
Total	566,735.35	17,557,432.92	18,124,168.27

All the gold bars ($566,735.35) exchanged for gold coin at Philadelphia, and $5,934,336.70 of the amount of gold bars exchanged for gold coin at New York, under the provisions of the act of May 26, 1882, were employed in the industrial arts. The remainder of the total bars exchanged, viz, $11,623,096.22, was exported.

The following table shows the amounts and the classification of the material used in the industrial arts in the United States each year since 1880:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, DURING THE CALENDAR YEARS 1880–1897.

GOLD.

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880	$3,300,000	$6,000,000	$395,000	$1,267,600	$10,962,600
1881	2,700,000	7,000,000	522,900	1,547,800	11,770,700
1882	2,500,000	7,000,000	696,500	671,500	10,868,000
1883	4,875,000	7,840,000	1,549,300	194,500	14,458,800
1884	5,000,000	6,000,000	3,114,500	385,500	14,500,000
1885	3,500,000	6,736,927	1,408,902	178,913	11,824,742
1886	3,500,000	7,003,480	1,928,046	638,003	13,069,529
1887	3,500,000	9,090,342	1,835,882	384,122	14,810,346
1888	3,500,000	9,893,057	2,402,976	718,809	16,514,842
1889	3,500,000	9,686,827	3,218,971	291,258	16,697,056
1890	3,500,000	10,717,472	3,076,426	362,062	17,655,960
1891	3,500,000	10,697,679	4,860,712	628,525	19,686,916
1892	3,500,000	10,588,703	4,468,685	771,686	19,329,074
1893	1,500,000	8,354,482	2,777,165	804,254	13,435,901
1894	1,500,000	6,430,073	2,184,946	543,585	10,658,604
1895	1,500,000	8,481,789	2,976,269	471,027	13,429,085
1896	1,500,000	7,209,787	2,369,343	316,804	11,395,934
1897	1,500,000	7,184,822	2,571,428	613,981	11,870,231
Total	53,875,000	145,915,440	42,357,951	10,789,929	252,938,320

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED,—Continued.

SILVER (COINING VALUE).

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880	$600,000	$5,000,000	$145,000	$353,000	$6,098,000
1881	200,000	5,900,000	178,000	371,000	6,649,000
1882	200,000	6,344,300	212,900	440,300	7,197,500
1883	200,000	4,623,700	561,900	155,000	5,540,600
1884	200,000	4,500,000	170,000	650,000	5,520,000
1885	200,000	4,539,875	462,186	62,708	5,264,769
1886	200,000	3,626,195	404,155	825,615	5,055,965
1887	200,000	4,102,734	480,606	654,991	5,438,331
1888	200,000	6,477,857	652,047	771,985	8,101,889
1889	200,000	7,297,933	611,015	657,997	8,766,945
1890	200,000	7,143,635	640,100	1,245,419	9,229,154
1891	200,000	7,289,073	858,126	1,256,101	9,603,300
1892	200,000	7,204,210	647,377	1,249,801	9,301,388
1893	100,000	6,570,737	1,222,836	1,740,704	9,634,277
1894	100,000	8,579,472	1,221,177	982,399	10,883,048
1895	100,000	9,825,387	1,378,136	973,501	12,277,024
1896	100,000	7,965,449	1,076,829	1,061,995	10,204,273
1897	100,000	9,200,497	1,103,460	797,193	11,201,150
Total	3,500,000	116,191,054	12,025,850	14,249,709	145,966,613

THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD AND SILVER IN 1897.

The following questions relative to the industrial consumption of gold and silver in the different countries of the world in 1897 were contained in the list of interrogatories in the last circular of the Bureau of the Mint for that year, addressed to foreign Governments through our representatives abroad:

No. 3. What was the weight of fine gold used in the industrial arts during the calendar year 1897?

No. 4. What amount of this was new gold and what amount old gold?

No. 5. What was the weight of the silver used in the industrial arts during the calendar year 1897?

No. 6. What amount of this was new silver and what amount old silver?

Most of the Governments interrogated answered that there was no information on these subjects to be given. Their respective replies to the above questions, so far as received, were as follows:

From Australasia.—Weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897: "No estimate is given. Impossible to estimate."

From Argentina.—Weight and value of gold and silver, new and old, used in the industrial arts during the calendar year 1897: "Can not be answered, as there are no statistics extant on the subject."

From Austria-Hungary.—Relative to the industrial consumption of the precious metals in 1896: "In 1896 there were used for industrial

purposes, in the countries represented in the Reichsrath, gold as follows:

Items.	Weight.
	Kilograms.
Coins	2,097.344
Gold, alloyed	284.851
Pure gold	259.822
Total (pure)	2,784.134

"The silver used for industrial purposes in 1896 consisted of—

Items.	Weight.
	Kilograms.
Coins	478.177
Silver, alloyed	5,405.210
Old silver	1,233.717
Pure silver	48,346.978
Total (pure)	55,464.082

From Austria.—Relative to the industrial employment of gold and silver in 1897: Weight and value of gold and silver, new and old, used in the industrial arts during the calendar year 1897. "During 1897 there were brought to the Imperial stamping office in Vienna:

Items.	Weight.
	Kilograms.
Domestic gold articles	3,979.217
Domestic silver articles	52,776.265

"No data are given yet showing the gold and silver material used in the foregoing."

From Hungary.—"No data are on hand showing the amount of gold and silver used for industrial purposes (during 1897). There were presented at the royal Hungarian stamping office, for the purpose of being officially stamped:

Items.	Kilograms.
Domestic goods:	
Gold ware	833.343
Gold ware	8,992.962
Gilt wire:	
Gold	8.531
Silver	594.861
Silver wire	327.826
Foreign ware:	
Gold ware	182.145
Silver ware	2,353.876
Gilt wire:	
Gold	.075
Silver	4.569
Silver wire	.227

"Among the gold and silver ware there were 10,617 gold watches, weighing 167.922 kilograms, and 50,812 silver watches, weighing 1,355.975 kilograms. No data are on hand to make replies regarding what amount used in the industrial arts was old or new gold and silver."

From Austria-Hungary.—"Concerning the industrial consumption in the Empire of both metals in 1896:

"The total value of the industrial consumption of gold and silver in Austria-Hungary in 1896, amounted to—

Items.	Quantity.	Value per kilogram.	Total value.
	Kilograms.	*Florins.*	*Florins.*
Fine gold	3,584.751	1,640	5,878,992
Fine silver	64,841.442	53	3,436,596
Total	.....	.....	9,315,588

"Besides which there was imported from foreign countries in 1896:

Items.	Quantity.	Value.
	Kilograms fine.	*Florins.*
Gold ware into Austria	1,354.500	.....
Gold ware into Hungary	101.027	.....
Total	1,455.527	*a* 2,387,064
Silver ware into Austria	11,967.499	.....
Silver ware into Hungary	1,478.797	.....
Total	13,446.296	*b* 712,654

a At 1,640 florins per kilogram. *b* At 53 florins per kilogram.

"IMPERIAL ROYAL STAMPING OFFICE, *Vienna.*"

The latest received from Austria-Hungary, relative to the industrial use of gold and silver in 1897, was the following:

IMPERIAL ROYAL PRINCIPAL HALL-MARK BUREAU,
(K. K. HAUPTPUNZIRUNGSAMT),
Vienna, July 19, 1898.

The DIRECTOR OF THE MINT, *Washington, D. C.*

SIR: Supplementary to the information to your Bureau under date of February 28, 1896, I now send you the figures relating to the industrial consumption of gold and silver in Austria-Hungary in 1897.

ADOLPH MADER,
Imperial Royal Court Counsellor.

The quantities of gold and silver industrially employed in Austria-Hungary in 1897 were as follows:

Items.	Kilograms fine.
Gold:	
Hall-marked domestic gold wares—	
In Austria—	
Utensils—3,979.217 kilograms, crude, at 582.941 mm. fine	2,319.648
Wire	32.691
Total	2,352.339
In Hungary—	
Utensils—1,436.302 kilograms, crude	837.364
Wire	10.360
Total	847.724
In Austria and Hungary	3,200.063
In addition thereto fine gold employed for other industrial purposes in Austria	543.110
Total	3,743.173
Silver:	
Hall-marked domestic silver wares—	
In Austria—	
Utensils, 52,776.265 kilograms crude, at 794.821 mm. fine	41,947.674
Wire	2,304.464
	44,252.138
In Hungary—	
Utensils, 11,272.729 kilograms crude	8,961.819
Wire	920.897
	9,882.691
Total Austria-Hungary	54,134.834
In addition thereto, fine silver used in Austria for other industrial purposes	13,052.663
Total fine silver	67,187.497

No further data relative to the fine gold and fine silver industrially consumed in Hungary for other purposes are known.

For the quantities of fine gold and fine silver used for "other industrial purposes" in Austria the Government is entirely dependent on the disposition of manufacturers to furnish such information.

The total value of the industrial consumption of Austria-Hungary in 1897 amounted, for the gold, to 3,743.173 kilograms fine, at 3,280 kronen per kilogram, to 12,277,607.44 kronen; and for the silver, 67,187.497 kilograms fine, at 95.50 kronen per kilogram, to 6,416,405.96 kronen; a total of 18,694,013.40 kronen.

Besides which, there was imported from foreign countries, in 1897—

Items.	Quantity.	Value.
Gold wares:	*Kilos. fine.*	*Kronen.*
Into Austria	1,348.953	
Into Hungary	184.518	
Total	1,533.471	*a* 5,029,784.88
Silver wares:		
Into Austria	12,320.041	
Into Hungary	2,296.474	
Total	14,616.515	*b* 1,395,877.18

a At 3,280 kronen per kilogram fine. *b* At 95.5 kronen per kilogram fine.

IMPERIAL ROYAL PRINCIPAL HALL-MARK BUREAU
(K. K. HAUPTPUNZIRUNGSAMT),
Vienna, July 28, 1898.

To the Director of the Mint, Washington, D. C.

SIR: I have the honor to acknowledge the receipt of your letter of April 14, 1898, and in answer to the same state that it is not possible as yet to give any accurate data relative to the quantities of old gold and old silver industrially employed in Austria-Hungary, but that, by way of estimate, they may at present be placed at 25 per cent of the total gold industrially employed and 20 per cent of the silver similarly used.

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ADOLPH MADER,
Imperial Royal Court Counselor.

From Belgium.—Weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897: "Since the law of June 5, 1868, granting the free working of gold and silver, it is impossible to give the figures of these metals used in the industrial arts."

From British India.—"Until the closure of the Indian mints in June, 1893, practically all the silver imported into India (none is produced in the country) was coined either in the mints of the Government or in those of the native States. Much of the coin was withdrawn annually from circulation, to be hoarded or converted into ornaments, but there are no data, except the imports of silver during the period since the closure of the Government mints, on which to frame an estimate of the quantity actually so withdrawn. But these imports have been substantially affected by speculation arising out of special and transitory conditions, and they form as yet an uncertain basis on which to frame an estimate. It is not possible to say what proportion was horded in form of rupees, bars, ingots, or ornaments."

From China.—"No statistics" as to the value of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897.

From Costa Rica.—Weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897, "Unknown."

From Denmark.—"No information can be given by the minister of finance as to the weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897."

From Egypt.—Weight of fine gold used in the industrial arts during the calendar year 1897, "1,435.8 kilograms; amount of new and old gold used, unknown." Weight of fine silver used in the industrial arts during the calendar year 1897, "6,292.1 kilograms; amount of new and old silver used, unknown."

From France.—"It is believed that the weight of gold and silver used in the industrial arts during the calendar year 1897 was 20,000 kilograms for gold and 200,000 kilograms for silver. No information as to what amount of this was new and what amount was old gold and silver."

From Germany.—Weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897: "These questions can not be answered, for a want of official information."

From Great Britain.—Weight of fine gold and fine silver, new and old, used in the industrial arts during 1897, "No information available."

From Greece.—Weight of fine gold and fine silver, new and old, used in the industrial arts during the calendar year 1897, "None; not ascertainable."

From Haiti.—Weight of fine gold and fine silver, new and old, used in the industrial arts during 1897, "None."

From Italy.—Weight and value of gold and silver, new and old, used in the industrial arts during 1897, "The production and manufacturing of precious metals not being controlled by any compulsory law or regulation, and consequently free, and this in view of the law of May 2, 1872, no elements are at hand to answer these questions."

From Japan.—Weight of fine gold and fine silver, new and old, used in the industrial arts during 1897, "Not known."

From Korea.—"It is impossible to get statistics as to subjects of these interrogatories. The Korean Government keeps no statistics of production, and aside from the customs returns it is impossible to obtain accurate information upon the subjects covered by the interrogatories."

From the Netherlands.—Weight of fine gold used in the industrial arts during the calendar year 1897, "519 kilograms of fine gold." Weight of fine silver used in the industrial arts during the calendar year 1897, "10,227 kilograms of fine silver." "What amount of this was new and what amount was old gold and silver can not be said."

From Norway.—"It is not possible to give any information concerning the weight and value of gold and silver used in the industrial arts during the calendar year 1897."

From Paraguay.—Weight of fine gold and fine silver, new and old, used in the industrial arts during 1897: "Impossible to be found; no statistics kept." Received the following information which may be of use to you: "I can obtain no information as to the relative amounts of gold and silver used in this country during the year 1897. In Europe this would be very easy, but in Paraguay it is impossible, as, firstly, any one who likes can buy and sell gold, whereas in Europe, or at any rate, in England, a tax of £2 6s. a year is put on all jewelers and workers in fine metals; secondly, in Paraguay 'hall-marking' does not exist, which makes it impossible for the Government to keep a record of gold and silver used in the fine arts, which is a fact greatly to be deplored, as by means of the 'hall-mark' the standard of gold and silver is maintained and base gold can not be sold as fine gold, as is often done in Paraguay."

From Persia.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897: "Can not be answered, even approximately."

From Peru.—Weight of fine gold and fine silver used in the industrial

arts during the calendar year 1897: "No statistics are available for answering these questions."

From Portugal.—Weight of fine gold, new and old, used in the industrial arts during the calendar year 1897, "9 kilograms; amount of new and old gold, not specified." Weight of fine silver used in the industrial arts during the calendar year 1897, "108 kilograms; amount of new and old silver, not specified."

From Roumania.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897: "Unknown; impossible to ascertain."

From Russia.—Weight of fine gold and fine silver used in the industrial arts during 1897. Unanswered.

From Servia.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897: "Amount is insignificant."

From Sweden.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897: "The whole amount of gold and silver used in the industrial arts can not be estimated, but the weight of the objects that were stamped at the Government Assay Office was 464 kilograms of fine gold and 4,250 kilograms fine silver. For striking medals, 14 kilograms fine gold and 280 kilograms fine silver were used during the same year. These were stamped from bullion, but it was not known how much new material was used for the other objects."

From Switzerland.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897: "No answer can be given to these interrogatories, owing to lack of information."

From Turkey.—Weight of fine gold and fine silver used in the industrial arts during the calendar year 1897. Unanswered.

Besides the above-named countries, a few less important ones replied to the interrogatories of this Bureau that they also possessed no information as to their industrial employment of the precious metals. Thus, very few Governments collected any statistics at all in 1897 on this important subject, and the information of the few that did is by no means satisfactory, especially because they did not, or could not, ascertain what amount of the gold and silver annually employed in arts was new material—that is, metal recently produced—and what amount was old gold or silver resulting from the melting down of articles manufactured, perhaps, a century or more ago. Only after the amount of gold and silver industrially employed has been ascertained, can the quantity available for monetary purposes in any given year be figured out. Hence the importance of the statistics of the industrial consumption of gold and silver. Hence, too, the part they must necessarily play in the discussion of the monetary question.

The series of answers given above, from the various countries, to our representatives in them would make it appear impossible to form a trustworthy estimate of the total amount of the world's product of gold

and silver used in the industrial arts in the year, or the year after it was obtained from the mines. Fortunately, there are other sources besides Government statistics from which, at least, some information on the subject can be obtained. But even after this last information has been utilized to the utmost, by the most skillful hands, the result reached inspires no great confidence as to its accuracy. The most that can be said of it is that it is an approximation to the truth. But can it be claimed that even as an estimate it is approximately correct? Dr. Soetbeer estimated the yearly industrial consumption of gold (old and new material) at between 100,000 and 120,000 kilograms, fine, thus leaving a margin for error of 20,000 kilograms, fine, of the value of $13,292,000, representing over 9 per cent of the total gold production of the world in 1891, when Dr. Soetbeer gave his final sanction to that estimate. Eight years earlier, in 1883, the same distinguished statistician estimated it at 110,000 kilograms, 90,000 of which was new gold, of the value of $59,814,000, equal to 67 per cent of the total gold product of that year. In 1892, Professor Lexis estimated the industrial consumption of gold in the world at $71,400,000; in 1896, at $48,790,000, explaining the second lower estimate, in the following words:

> This amount is smaller than the one I, myself, formerly accepted, but it is not probable that it is too high. Rather might it be assumed that the additions made for the uncontrolled gold consumption in France and England is too large. On the other hand, it is probable that the industrial consumption of gold in the United States will increase again in the next succeeding years. But even if we assume an annual industrial consumption of gold in recent years of 220,000,000 marks ($52,300,000), and add to this $7,140,000 for export to India and Eastern Asia, we have, for Europe and America, from $111,860,000 to $114,240,000 remaining to increase their monetary stock, which is amply sufficient for the wants of all countries which, considering their financial situation and their international indebtedness, are able to maintain the gold standard.

The estimate made by the Bureau of the Mint of the industrial consumption of gold in 1896 was $59,262,000, representing 89,154 kilograms, fine, of new gold.

The replies of the several Governments to the interrogatories of this Bureau relating to the employment of gold and silver in the arts in 1897 are published above in full, and attention has been here called to the estimates of that consumption at different times by such authorities as Soetbeer and Lexis, in order to afford the reader an opportunity to form a just idea of the precise value to be attached to data of that employment, published by this Bureau, or emanating from other sources, as well as of the difficulty of forming such estimates, and of their inevitable uncertainty.

It will be noticed that the only replies giving any figures in the answers cited above are from Austria-Hungary, Egypt, France, The Netherlands, Portugal, and Sweden.

An effort will now be made, as in 1896, to form as accurate an estimate as the figures at our command will permit, whether obtained from Government or other sources, of the industrial consumption of gold

and silver in the civilized world in 1897. Where no new information for 1897 has been received, no better can be done than to repeat the language and figures we employed in 1896; and first, of

GOLD.

(1.) *Austria-Hungary.*—The amount of gold employed in industry in Austria-Hungary in 1897 was, according to the chief of the "hall-marking" bureau of Vienna, 3,743.173 kilograms, fine; 25 per cent of which was, he says, "probably, old gold," thus making the quantity of new gold so used, in 1897, about 2,807 kilograms, of the value of $1,865,532.20.

The Austro-Hungarian Government devotes special attention to the collection of the statistics of the consumption of the precious metals, as is evidenced by the minuteness of the information it has sent this Bureau, in answer to our interrogatories.

(2) *Egypt.*—Previous to 1897 Egypt sent no answers to our questions relating to the use in the arts of gold and silver. For 1897 it gives an industrial employment of gold of 1,436 kilograms, but does not say how much of this was old gold. Dr. Soetbeer never assumed the amount of old gold in the quantities employed industrially in a country to be greater than 25 per cent, and we are probably safe in following him in this in the case of Egypt, which would enable us to credit it with an industrial gold consumption in 1897 of 1,077 kilograms, of the value of $715,774.20.

(3) *England.*—The Bureau of the Mint has received no official information as to the industrial gold consumption of England in 1897, and recourse is therefore had, as last year, to an estimate of the same. According to the memorandum by Mr. W. Chandler Roberts Austen, chemist and assayer, published in the reports of the deputy master of the royal mint, London, for 1893, 1894, 1895, 1896, and 1897, the number of ounces of gold wares assayed and marked by the wardens of the assay offices at Birmingham and Chester, from 1889 to 1897, inclusive, was as follows:

Year.	Birmingham.	Chester.	Total.
	Troy ounces.	*Troy ounces.*	*Troy ounces.*
1889	158,769	41,883	200,652
1890	193,426	51,166	244,592
1891	230,136	53,715	283,851
1892	228,018	55,789	283,807
1893	229,016	61,318	290,334
1894	223,759	62,442	286,201
1895	239,472	73,283	312,755
1896	283,423	97,281	380,704
1897	311,335	109,187	420,522
Total	2,097,354	606,064	2,703,418

These figures are far from representing the total industrial gold consumption of the United Kingdom, which must, if we are to be guided

by earlier estimates, be placed at, at least, twice these amounts for the years 1889-1897. Professor Lexis estimated it to have been 500,000 ounces, or about 15,500 kilograms net, which figure is here adopted.

(4) *France.*—M. de Foville, director of the mint, Paris, states that the fine weight of the gold employed in the industrial arts in France in 1897 may be estimated at 20,000 kilograms, but that the administration had no data to enable it to answer the interrogatory in regard to the amount of new gold so used during the year. It is highly probable, however, that some part of the 20,000 kilograms of gold reported as used in industry in 1897 was "old material," probably 20 per cent, or one fifth. This is the percentage of the total consumption of gold in France assumed by Dr. Soetbeer, in his table of the industrial consumption of gold in the world in 1871 to 1880, to have consisted of such material. Twenty per cent of 20,000 kilograms is 4,000 kilograms, which would leave the net consumption of gold in France in 1897, for industrial purposes, 16,000 kilograms.

(5) *Germany.*—In 1885—that is, thirteen years ago—Dr. Soetbeer estimated Germany's industrial gold consumption at 12,000 kilograms of new gold. In 1896 Professor Lexis estimated it at the same quantity. Considering the great increase in the world's supply since Soetbeer made his estimate, as well as the growing industrial activity of Germany, it is not unreasonable to suppose that its employment of gold in the arts has since then risen 10 per cent, which would make it at present about 13,200 kilograms of new gold, of the value of $8,772,720.

(6) *Italy.*—In 1885 the industrial gold consumption of Italy was estimated by Dr. Soetbeer at 4,500 kilograms. It seems not unreasonable to assume that it has since risen to 5,000 kilograms of new gold, of the value of $3,323,000.

(7) *Belgium and Netherlands.*—This Bureau in 1896 estimated the use of gold in the arts in Belgium and the Netherlands together, saying:

Belgium gives no figures of the industrial use of gold in the country in the year 1896, and it is evident that the answer of the Netherlands quoted above furnishes no sufficient basis for an estimate of the industrial consumption of gold in the Netherlands for 1896. In the absence of more definite data the estimate of that consumption made by Dr. Soetbeer for the Netherlands and Belgium in 1885, viz, 2,900 kilograms net, with an addition of 200 kilograms for increase during the last ten years, makes the industrial consumption of the two last-named countries for 1896 3,100 kilograms net.

The answer of the Netherlands to our inquiries for 1896 was:

During the year 1896 new work in gold and silver was presented at the various stamping offices to the following amounts:

	Kilograms.
Fine gold	50
Fine silver	9,220

It is unknown what was the amount of new or old material used in the above works.

Their answer to the same for 1897 was:

	Kilograms.
Fine gold	519
Fine silver	10,227

In 1896 we accepted Dr. Soetbeer's figures, with an addition of 200 kilograms net, for increase in the two countries since 1885.

If Dr. Soetbeer's estimate was correct in 1885, and he was most cautious in making all his estimates, which were, in many instances, based on information received not from governments, but from private sources, it is next to certain that the estimate for 1897 should be placed at a higher figure than that for 1885, for it can scarcely be supposed that the use of gold in the arts has since decreased in these countries. We believe that if we had ample returns from Belgium, instead of none, these figures, supplemented by those of the Netherlands, would warrant us in continuing to hold for the present to the estimate of Dr. Soetbeer for both countries, plus the allowance of 200 kilograms for increase since 1885, thus placing the industrial gold consumption of Belgium and the Netherlands, as last year, at 3,100 kilograms net; and this we assume to have been the industrial consumption of gold in Belgium and the Netherlands in 1897.

(8) *Portugal.*—Portugal reports its industrial consumption of gold in 1897 at only 9 kilograms, which may be assumed to be all new gold.

The amount in 1895 was 1,160 kilograms.

(9) *Russia.*—Russia having made no report to this Bureau of its industrial use of gold in 1897, it is assumed to have been the same as in 1896, viz, 4,087 kilograms net, of the value of $2,716,220.

(10) *Sweden.*—The amount of fine gold employed in the arts in 1897, so far as known, in Sweden was 464 kilograms, of which 10 per cent may be assumed to have been old gold, leaving a net amount of new gold used of 418 kilograms.

(11) *Switzerland.*—In the report of this series for 1896 the following statement appeared with respect to Switzerland's industrial employment of gold, and in the absence of any new information for 1897 no better can be done than to adopt the figures in it for the last-mentioned year:

Returns for 1894 and 1895 placed the value of the gold and silver used for industrial purposes in Switzerland at a total of 40,000,000 francs, the greater part of that sum representing gold.

From the Tabellen zur Währungs-Statistik, Sechster Abschnitt, Vienna, 1890, page 134, we learn that 37,000,000 francs of this amount was gold and 3,000,000 francs silver. Assuming 20 per cent of the consumption of gold to have been old material leaves a net industrial gold consumption in 1895 of 29,600,000 francs, or, in round numbers, $5,712,800, representing 8,596 kilograms. The industrial consumption of gold in 1896 is assumed to have been the same as in 1895.

(12) *Other countries.*—The industrial consumption of gold in civilized countries, other than the United States and those mentioned above, may be reasonably assumed to be 5,000 kilograms. Reducing the above to tabular form, the world's industrial consumption of gold in 1897 may be placed at 88,784 kilograms, of the value of $59,005,980.

In conclusion.—The estimate of the world's consumption of gold given below would be very unsatisfactory if it were not that the figures for several countries are well authenticated, and these furnish a criterion for

judging of the rest. The figures for the United States are certainly close to the truth. It is known that the large manufacturing jewelers use bars obtained from the mints and private refineries, the aggregate of which is easily ascertained. They get full weight in bars, and do not when they melt coin. A constantly increasing proportion of the business is done by the large concerns, which for the above reason systematically prefer bars to coin. An estimate, believed to be liberal, is made for the coin melted and the final result is reasonably accurate. This close calculation for the United States makes its consumption $9,298,000 in an estimate of $59,005,000 for the world, and when the population, wealth, and habits of the people are considered it is believed that the other countries are not underestimated. The figures for France, Great Britain, and Austria-Hungary are also based upon sufficient data to make them fairly acceptable.

THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD IN 1897.

Country.	Weight.	Value.
	Kilograms.	
Austria-Hungary	2,807	$1,865,530
Belgium and Netherlands	3,100	2,060,260
Egypt	1,077	715,770
England	15,500	10,301,300
France	16,000	10,633,600
Germany	13,200	8,772,720
Italy	5,000	3,323,000
Portugal	9	5,980
Russia	4,087	2,716,220
Sweden	418	277,800
Switzerland	8,596	5,712,800
United States	13,990	9,298,000
Other countries	5,000	3,323,000
Total	88,784	59,005,980

SILVER.

(1) *Austria-Hungary.*—The amount of pure silver industrially employed in Austria-Hungary in 1897 was 67,187.494 kilograms, of which Imperial Royal Court Counselor Adolph Mader informs us about 20 per cent was old silver, leaving the quantity of new silver used in the arts in Austria-Hungary in 1897, 53,750 kilograms.

(2) *Belgium.*—Professor Lexis estimated the industrial consumption of silver in Belgium in 1895 at 20,000 kilograms, and his estimate for that year is here adopted for 1897, this Bureau having no later or better information.

(3) *Egypt.*—Egypt reports for 1897 a gross industrial consumption of fine silver of 6,292 kilograms, of which 80 per cent, or 5,034 kilograms, may be assumed to have been new silver, and at which figure it is placed in the table below.

(4) *England.*—No new information having been received as to the industrial use of silver in England in 1897, we can only repeat here what was said of it in the last report of this series, viz:

Professor Lexis estimates the net industrial consumption of silver in England in 1895 at 140,000 kilograms, and, in the absence of more reliable data, that estimate is accepted by this Bureau as a close approximation to the actual amount industrially employed in that country. Professor Lexis says:

"In view of the estimate made of the industrial employment of silver in France (141,000 kilograms) and that of the United States in 1894 (232,000 kilograms), the figure assumed by Mr. Ottomar Haupt to represent the net industrial consumption of silver in England in 1890 seems decidedly too low; nor do the statistics of the consumption of crude silver in England, published by the Frankfurt Metallgesellschaft, based on the imports and exports and the estimated domestic production of silver, inspire much confidence. For 1893 and 1894 the figures are 213,000 and 234,000 kilograms, while for 1891 and 1892 they show an export of crude silver (1,647,000 kilograms and 923,000 kilograms) greater than the sum of the domestic production (600,000 and 926,000 kilograms) and imports of crude silver (974,000 and 926,000 kilograms) by 121,000 and 104,000 kilograms, respectively. But, besides these items, the imported and exported foreign silver coins should have been taken into consideration, since they, too, may be employed as industrial raw material. If these be included, the average annual industrial consumption of silver in England is found to be 206,000 kilograms. For coinage there was used, after deduction of the abraded coins recoined during this period, an annual average of 97,000 kilograms of fine silver, and hence 113,000 kilograms were used annually for other purposes. The principal bases of this calculation, especially the estimate of the silver obtained from foreign ores, are very uncertain, and, when we compare the silver consumption of the United States and France with that of England, we feel disposed to place the industrial employment of silver in the latter country at at least as high a figure as that of France."

Professor Lexis accordingly estimates it at 140,000 kilograms of new gold, which figure we accept.

(5) *France.*—The industrial consumption of silver in France in 1897 is reported to us at 200,000 kilograms, one-quarter of which may have been old material, leaving that country a net industrial silver consumption in 1897 of 150,000 kilograms net.

(6) *Germany.*—Professor Lexis estimated the industrial consumption of silver in Germany in 1895 at 150,000 kilograms, which figure is here adopted as representing, approximately, its product in 1896.

(7) *Italy.*—In 1885 Dr. Soetbeer estimated the industrial consumption of silver in Italy to be 19,000 kilograms, since when it may be assumed to have increased at least 10 per cent, making it in 1896 about 21,000 kilograms.

(8) *Netherlands.*—The industrial consumption of silver in the Netherlands in 1897 is officially reported to this Bureau at 10,227 kilograms, 20 per cent of which may be assumed to have been old material, making the net industrial consumption of the country 8,182 kilograms.

(9) *Portugal.*—Portugal's industrial consumption of silver in 1897 is reported at 108 kilograms.

(10) *Russia.*—Russia's employment of silver in the arts in 1897 is assumed to have been the same in amount as was officially reported for 1896, viz, 94,852 kilograms, net.

(11) *Sweden.*—The ascertainable employment of silver in the arts (inclusive of the manufacture of medals) in Sweden in 1897 was 4,530 kilograms, fine, of which four-fifths, or 3,624 kilograms, may be assumed to have been new silver.

(12) *Switzerland.*—According to the Austrian Tabellen zur Wahrungs-Statistik, Sechster Abschnitt, Vienna, 1896, page 134, the industrial consumption of silver in Switzerland in 1894 was 3,000,000 francs, or about $600,000, which represents, at the average price of silver in 1895, viz, $21.029 per kilogram, about 28,500 kilograms. Professor Lexis, however, estimates it at 25,000 kilograms, net, while it was estimated by Soetbeer for the period 1871–1880 at 24,000 kilograms, and he calculated it at the same figure in 1885. Haupt estimated it in 1892 at 50,000 kilograms. The information received by the Bureau of the Mint is that the total consumption of gold and silver in Switzerland represents a value of 40,000,000 francs, divided between the two metals in the proportion of 37 to 3. It therefore places the net industrial consumption of silver in Switzerland in 1894, 1895, 1896, and 1897 at about 28,500 kilograms, in round numbers.

(13) *Other countries.*—In 1885 Dr. Soetbeer estimated the industrial consumption of silver, in countries other than those mentioned above, at 40,000 kilograms. It may be safely assumed that it has since increased at least 10,000 kilograms, and it is therefore estimated in 1897 at a minimum of 50,000 kilograms, net.

Adding the figures given above for the various countries, the world's industrial employment of silver in 1897 is found to be 810,730 kilograms, of the coining value of $89,010,222 and the commercial value, at the average price of silver in 1897 of $0.60 per fine ounce, of $45,049,487.

THE WORLD'S INDUSTRIAL CONSUMPTION OF SILVER IN 1897.

Countries.	Weight.	Coining value.	Commercial value.
	Kilograms.		
Austria-Hungary	53,750	$2,233,850	$1,036,646
Belgium	20,000	831,200	385,729
Egypt	5,034	209,213	97,088
England	140,000	5,818,400	2,700,101
France	150,000	6,234,000	2,892,966
Germany	150,000	6,234,000	2,892,966
Italy	21,000	872,760	405,015
Netherlands	8,182	340,027	157,794
Portugal	100	4,156	1,929
Russia	95,000	3,948,200	1,832,212
Sweden	3,600	149,616	69,431
Switzerland	28,500	1,184,460	549,663
United States	247,779	10,297,695	4,778,772
Other countries	50,000	2,078,000	964,322
Total	972,945	40,435,577	18,764,634

THE WORLD'S PRODUCTION OF GOLD AND SILVER IN 1897.

The world's gold production in 1897 was 357,364 kilograms, or 11,489,291 ounces, fine, of the value, in round numbers, of $237,504,800, an increase over the gold production of 1896 of 52,398 kilograms, or 1,684,543 ounces, fine, of the value of $34,822,500.

It was remarked, in the report of this series for the year 1893 (published in 1894), that the world's output of gold in the former year was the largest in history. Since then, however, the gold product of every succeeding year has been greater than that of the preceding, as will be seen from glancing at the table of the product of gold and silver in the world since 1860, given below.

The world's gold yield in 1897 exceeded that of 1893 by 120,390 kilograms, or 3,870,480 ounces, fine, of the value of $80,010,000. It was greater than that of 1883, viz, $95,392,000, by $142,112,800, or 149 per cent. It exceed that of 1873, viz, $96,200,000, by $141,304,800, or 147 per cent, and the average yield of the years 1856–1860, when the gold production of California and Australia was highest, being valued at $134,083,000, by $103,421,800, or 77 per cent. It was double in 1897 what it was in 1890.

The value of the gold alone, extracted from the mines of the world, in 1897, was $65,803,800 greater than that of the average yield of both metals in the period 1856–1860, just referred to.

There is the best of reasons for believing that this increased production is permanent, in the sense of being probable for years to come. There was a phenomenal increase in gold production about 1850 which afterwards was not maintained, the average of 1856–1860 not being reached again until 1892. That increase came from the discovery of placers which in time were exhausted. The recent increase, however, has come from discoveries in methods of reducing ores. The known deposits of these ores which formerly defied treatment, but which must now yield up their treasures, give assurance that the present rate of production is not likely to soon decline. On the other hand, gold production under these conditions has, in great fields lately unknown, assumed the character of a staple manufacturing industry and capital is available for it in sums which promise unexampled development in the future. The increase in Colorado from $4,150,000 in 1890 to $19,104,200 in 1897; of Australasia from $29,808,000 in 1890 to $55,684,200 in 1897; of Africa, from $1,438,000 in 1886 to $58,306,600 in 1897, illustrates what the improved methods for treating ores are doing for the world's supply of gold.

The following table shows in what countries there was an increase and in what a decrease of their gold yield in 1897, as compared with 1896:

GOLD.

Country.	Increase in 1897.	Decrease in 1897.
United States	$4,275,000	.....
Australasia	10,502,300	.....
Mexico	1,104,600	.....
Russia	1,709,900	.....
Germany	234,000	.....
Austria-Hungary	82,900	.....
Sweden	8,300	.....
Italy	54,200	.....
Great Britain	10,500	.....
Dominion of Canada	3,216,900	.....
Argentina	.....	$177,400
Chile	.....	479,000
Brazil	203,100	.....
Guiana:		
British	81,500	.....
Dutch	10,400	.....
French	.....	569,900
Peru	511,400	.....
Uruguay	4,900	.....
China	.....	814,900
Africa	13,725,500	.....
British India	1,117,000	.....
Korea	11,300	.....
Total	36,863,700	2,041,200
Net increase	34,822,500	.....

The world's production of silver, in 1897, was 5,696,110 kilograms, or 183,096,090 ounces, fine, of the commercial value of $109,857,700 and the coining value of $236,730,300 as compared with a silver product of 5,232,021 kilograms, or 168,178,550 ounces, fine, of the commercial value of $113,352,300, and the coining value of $217,442,900, in 1896. The world's silver production in 1897 was, therefore, about 15,000,000 fine ounces greater than that of 1896, and exceeded that of 1895 by a slightly larger amount, viz, 15,595,000 ounces.

The following table shows the countries whose silver product increased in 1897 as compared with 1896, and those whose yield shows a decrease:

SILVER.

Country.	Increase in 1897.	Decrease in 1897.
United States	.....	$6,432,000
Australasia	$1,023,300	.....
Mexico	10,675,400	.....
Russia	.....	66,600
Germany	.....	507,300
Austria-Hungary	137,600	.....
Sweden	3,800	.....
Italy	.....	179,200
Great Britain	.....	39,400
Dominion of Canada	3,042,400	.....
Argentina	71,500	.....
Chile	1,821,300	.....
Peru	9,736,600	.....
Total	26,511,900	7,224,500
Net increase	19,287,400	.....

As will be seen, the increase in the world's total output of silver in 1897 was due most largely to Mexico. The decline of the price of silver per ounce, standard, in London, to 23¾d. in August and September of 1897, was a matter of little importance to Mexico, so far as the production of the metal is concerned, for reasons which Ottomar Haupt set forth in Reuter's Finanz Chronik, February 19, 1898, as follows:

The largest part of the cost of operating the mines is paid for in the depreciated metal itself. Apart from coal and machinery, which have to be obtained from abroad, it is really a matter of indifference to the Mexican silver-mine owners whether the metal is quoted in London at 32½d. as in October, 1895, or 23¾d. as in August, 1897. He always receives through the mints of his country 40.92 piasters per kilogram, fine, less the cost of coinage, and with this money he pays his workmen and his other expenses in working his mines. Thus it has been, and always will be, so long as Mexico maintains the silver standard, and for this reason the decline of the price of silver in London has no effect on the silver mines of Mexico. Hence these mines will continue to produce, no matter how the metal declines in other countries. In other words, the cost of production expressed in piasters, declines with the depreciation of the monetary unit of the country, expressed in gold.

It is stating the proposition too broadly to say it is a matter of indifference to the Mexican mine owners how silver is quoted in London, for it does affect the value of their surplus; but paying their expenses as they do in silver, it perhaps requires no larger percentage of their product to operate the mines now than it did when silver was worth a higher price. They suffer loss only upon that portion which is profit. Their employees bear the loss upon the portion which is paid to them. And as a mere reduction of profits never suppresses an industry, but on the contrary often stimulates it to a greater output, the Mexican silver mines go on increasing their product.

Many causes have contributed to stimulate the production of silver in the United States during the past few years, despite the heavy decline in value of the metal, but the most important of these is, with-

out doubt, the development of the Manhè's method of bessemerizing copper mattes, and the successful refining of this impure copper by means of electricity.

Previous to the year 1889, the most difficult problem which the western metallurgist had to face was the extraction of gold and silver from copper-bearing ores. Should the ore be smelted into a matte it was necessary that this matte should be of sufficient value to yield a profit after paying all charges, including transportation to Europe, for at that time few American companies cared for the product, and such as purchased it imposed charges which were almost prohibitory.

Under the present imposed metallurgical conditions not only are argentiferous copper ores easily worked, but large amounts of dry ore are annually smelted with copper ore for the production of such mattes, the object being to collect the gold and silver of the ore in the copper, which by the subsequent electrolytic refining of the copper, the precious metals are recovered as by-products. When it is considered that copper refined by electrolysis is worth from ½ to 1 cent per pound more than copper refined by the older method; and further, the cost of refining a copper bullion containing 500 ounces of silver per ton is exactly the same as for refining bullion containing 50 ounces per ton, it would seem that the cost of production of silver from the ore is largely one of transportation to the smelter, since, with a large variety of ores at his command, the skillful metallurgist is able to so arrange his charge that little or no dead material, such as limestone, etc., need enter his furnace, thus the smelting capacity is increased, the smelting charges lowered, and correspondingly the cost of production.

What has been said in regard to copper smelting is largely true of lead, but the history of this industry in the United States extends over many years, while argentiferous copper smelting, as practiced at present, is a new industry.

The growth of this industry is shown by the following table:

TABLE SHOWING THE PERCENTAGE OF TOTAL PRODUCTION OF SILVER OBTAINED FROM THE SEVERAL SOURCES.

	1891.	1897.
Quartz mills	49.2	21.8
Lead bullion	40.6	57.5
Copper bullion	10.2	20.7
	100	100

In 1891 about one-half of the total silver produced came from quartz mills, and as the total expense of extraction had to be charged to the silver produced the cost per ounce was necessarily high. This table shows that in 1897 the mills produced but one-fifth of the total product, although the production had only decreased about 2,000,000 ounces.

During that period the product of the lead smelters increased nearly 30 per cent, while that of the copper smelters increased over 100 per cent. From these facts it is apparent that the decline in the price of silver has been met by improved methods of smelting and refining, and that no great decrease in the production of silver need be looked for in the near future.

The comparative showing of the amount of gold obtained from quartz and from placers illustrates and explains the progressive increase in the world's product of gold which began about ten years ago, whereas formerly the yield of gold came chiefly by the reduction of ore, and the increase is from ores of low grade or refractory character which modern methods have made available. The assurance of a continued increase lies in this recently acquired knowledge in metallurgy.

The following table shows, by calendar years, the production and value of gold and silver in the world from 1860 to 1897:

PRODUCT OF GOLD AND SILVER IN THE WORLD, 1860–1897.

[The annual production of 1860 to 1872 is obtained from 5-year period estimates, compiled by Dr. Adolph Soetbeer. Since 1872 the estimates are those of the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860	6,486,262	$134,083,000	29,095,428	$39,337,000	$37,618,000
1861	5,949,582	122,989,000	35,401,972	46,191,000	45,772,000
1862	5,949,582	122,989,000	35,401,972	47,651,000	45,772,000
1863	5,949,582	122,989,000	35,401,972	47,616,000	45,722,000
1864	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1865	5,949,582	122,989,000	35,401,972	47,368,000	45,772,000
1866	6,270,086	129,614,000	43,051,583	57,646,000	55,663,000
1867	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1868	6,270,086	129,614,000	43,051,583	57,086,000	55,663,000
1869	6,270,086	129,614,000	43,051,583	57,043,000	55,663,000
1870	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1871	5,591,014	115,577,000	63,317,014	83,958,000	81,864,000
1872	5,591,014	115,577,000	63,317,014	83,705,000	81,864,000
Total	78,766,630	1,628,252,000	547,997,231	729,563,000	708,521,000
1873	4,653,675	96,200,000	63,267,187	82,120,800	81,800,000
1874	4,390,031	90,750,000	55,300,781	70,674,400	71,500,000
1875	4,716,563	97,500,000	62,261,719	77,578,100	80,500,000
1876	5,016,488	103,700,000	67,753,125	78,322,600	87,600,000
1877	5,512,196	113,947,200	62,679,916	75,278,600	81,040,700
1878	5,761,114	119,092,800	73,385,451	84,540,000	94,882,200
1879	5,262,174	108,778,800	74,383,495	83,532,700	96,172,600
1880	5,148,880	106,436,800	74,795,273	85,640,600	96,705,000
1881	4,983,742	103,023,100	79,020,872	89,925,700	102,168,400
1882	4,934,086	101,996,600	86,472,091	98,232,300	111,802,300
1883	4,614,588	95,392,000	89,175,023	98,984,300	115,297,000
1884	4,921,169	101,729,600	81,567,801	90,785,000	105,461,400
1885	5,245,572	108,435,600	91,609,959	97,518,800	118,445,200
1886	5,135,679	106,163,900	93,297,290	92,793,500	120,626,800

PRODUCT OF GOLD AND SILVER IN THE WORLD, 1860-1897—Continued.

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1887	5,116,861	$105,774,900	96,123,586	$94,031,000	$124,281,000
1888	5,330,775	110,196,900	108,827,606	102,185,900	140,706,400
1889	5,973,790	123,489,200	120,213,611	112,414,100	155,427,700
1890	5,749,306	118,848,700	126,095,062	131,937,000	163,032,000
1891	6,320,194	130,650,000	137,170,919	135,500,200	177,352,300
1892	7,094,266	146,651,500	153,151,762	133,404,400	198,014,400
1893	7,618,811	157,494,800	165,472,621	120,119,900	213,944,400
1894	8,764,362	181,175,600	164,610,394	104,493,000	212,829,600
1895	9,615,190	198,763,600	167,500,960	109,545,600	216,568,900
1896	9,804,748	202,682,300	168,178,550	113,352,200	217,442,900
1897	11,489,291	237,504,800	183,096,090	109,857,700	236,730,300
Total	153,173,551	3,166,378,700	2,645,411,144	2,472,768,400	3,420,329,500
Grand total	231,940,181	4,794,630,700	3,193,408,375	3,202,331,400	4,128,850,500

WORLD'S COINAGE, 1895, 1896, AND 1897.

In the Appendix will be found a table, revised from the latest information received, exhibiting the coinages of the various countries of the world during the calendar years 1895, 1896, and 1897. The following is a summary of the same:

COINAGE OF NATIONS.

Calendar year.	Gold.	Silver.
1895	$231,087,438	$126,873,642
1896	195,899,517	159,540,027
1897	437,719,345	167,760,297

While the above figures represent, as accurately as the Bureau has been able to ascertain, the total value of the gold and silver coinage of the world during the calendar years 1895, 1896, and 1897, they do not accurately represent the value of the coinage from new material alone, but include the value of the recoinage of foreign and domestic coins, and that derived from old material, plate, jewelry, etc., melted and used in coinage. Many foreign governments in their reports to the Bureau failed to separate the values of the coinage derived from these various sources.

The following table exhibits, by calendar years, the fine ounces and value of the gold and silver coinage of the world from 1873 to 1897.

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE WORLD FOR THE CALENDAR YEARS 1873–1897.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	12,462,890	$257,630,802	101,741,421	$131,544,464
1874	6,568,279	135,778,387	79,610,875	102,931,232
1875	9,480,892	195,987,428	92,747,113	119,915,467
1876	10,309,645	213,119,278	97,899,525	126,577,164
1877	9,753,196	201,616,466	88,449,796	114,359,332
1878	9,113,202	188,386,611	124,671,870	161,191,913
1879	4,390,167	90,752,811	81,124,555	104,888,313
1880	7,242,951	149,725,081	65,442,074	84,611,974
1881	7,111,864	147,015,275	83,539,051	108,010,086
1882	4,822,851	99,697,170	85,685,996	110,785,934
1883	5,071,882	104,845,114	84,541,904	109,306,705
1884	4,810,061	99,432,795	74,120,127	95,832,084
1885	4,632,273	95,757,582	98,044,475	126,764,574
1886	4,578,310	94,642,070	96,566,844	124,854,101
1887	6,046,510	124,992,465	126,388,502	163,411,397
1888	6,522,346	134,828,855	104,354,000	134,922,344
1889	8,170,611	168,901,519	107,788,256	139,362,595
1890	7,219,725	149,244,965	117,789,228	152,293,144
1891	5,782,463	119,534,122	106,962,049	138,294,367
1892	8,343,387	172,473,124	120,282,947	155,517,347
1893	11,248,342	232,420,517	106,697,783	137,952,690
1894	11,025,680	227,921,032	87,472,523	113,095,788
1895	11,178,855	231,087,438	98,128,832	126,873,642
1896	9,476,620	195,899,517	123,394,239	159,540,027
1897	21,174,673	437,719,345	129,752,104	167,760,297
Total	206,532,675	4,269,409,769	2,483,196,094	3,210,596,981

REPORTS OF THE SPECIAL AGENTS OF THE BUREAU OF THE MINT ON THE PRODUCTION OF THE PRECIOUS METALS IN 1897 IN THE SEVERAL STATES AND TERRITORIES.

I.

ALASKA.

By CHARLES G. YALE.

Returns received at the United States mint at San Francisco in response to circulars of inquiry show that the bullion yield of Alaska for 1897 was as follows:

Gold	$2,439,572
Silver (commercial value)	79,207
Total	2,518,779

Except from the regularly organized quartz-mining companies, it is very difficult to obtain exact returns from the Alaskan mines. The placer gold is obtained by individuals or small companies, and no books or accounts are kept. These men are nomadic to a certain extent, going from camp to camp or creek to creek, as new or better strikes are made. Their gold dust is sold at the stores of the trading companies or else they bring it out of the country themselves.

The writer of this chapter visited northwestern Alaska in the summer and fall of 1897, going up the Yukon River some 1,600 miles, where the low stage of water prevented farther progress toward Dawson. After a three-weeks' stay at Fort Yukon he was compelled to return down the river and then, by way of St. Michaels, Unalaska, and Seattle, to San Francisco. The mouth of the river was closed by the ice the day after he came out to St. Michaels on the return trip.

As far as the Alaskan placer mines are concerned, the conditions have materially changed from previous years. In 1897 most of the camps on the American side of the boundary line were practically deserted, men having gone to the Klondike mines in Northwest Territory, where phenomenally rich placers were discovered in the fall of 1896.

Of course some men remained at work on the older creeks, where they owned claims. Others, after going up river from Circle City or Forty Mile to the new "excitement," returned to work their old claims when the water flowed in the spring. After their clean-ups they again went back into British territory to prospect the new districts.

In this connection it is to be noted that a certain amount of gold obtained by miners in American camps will naturally be credited to Klondike creeks, as it was taken to Dawson by these miners and there *invested in claims or provisions.* It is impossible to segregate this

gold from that actually produced from British soil. As practically all the miners deserted the American side and all took more or less gold dust with them to Dawson, it will be seen that considerable American gold will come out from Dawson credited to the Klondike districts.

Circle City, which is the "city" of Birch Creek district, was, in September, 1897, almost entirely abandoned, there being upward of three hundred empty cabins at the time. Out in the diggings on the various tributaries of Birch Creek men were at work on some claims, but comparatively little work was being done.

Owing to the failure of the steamers to get up the river farther than Fort Yukon, supplies were scant at all places above that point, including Circle City, Forty Mile, and Dawson. This had a very serious effect on the mining industry on all the rivers and creeks. Numbers of men left the districts and came down the river in search of food for the winter, and those who learned of the scarcity in time came out on the river boats, leaving the country for the winter. Large caches of food were made by the transportation companies at Fort Yukon and 5 miles above that place, and later in the year, when there was danger of famine at Dawson, several hundred people came down the river and stayed where these provisions were. In fact, numbers of persons left Dawson and came down to Circle City for the winter, so as to avail themselves of the cabins already built at that place. Food was scarce, however, the whole winter of 1897-98 at all the camps above Fort Yukon.

Below that place on the Yukon River there were plenty of provisions, there being warehouses full at Fort Hamlin, Rampart City, Tanana, the Russian Mission, and the smaller places.

The question of food supply in the Yukon region has a very important bearing on the prosperity of the mining industry. The conditions are such that the price of provisions is high as compared with ordinary mining regions, and this brings the cost of living to such a point that only the richer diggings may be worked. In the various creeks of Forty Mile and Birch Creek districts, for instance, there is room for several thousand men to work on ground which will yield from $5 to $10 per day to the shovel, but there is no money in that as long as wages run from $10 to $15 per day. When provisions are cheaper and more abundant, wages will be lessened as well as cost of living, and then ground of this character will be worked. At present it is of no value whatever.

In view of the Klondike excitement and the advent of many thousands of men into the Yukon region, it is expected that there will be a material improvement in food supply. The fleet of river boats will be largely increased and means of transportation be more complete. Instead of two trading and transportation companies there will be several dozen. Many of these new enterprises will doubtless be failures, or will be ephemeral, at any rate, but in any event the facilities on the river will in the future be much better than in the past. Opposition

and competition will reduce prices and heavier quantities will be brought into the country. Above all, the stations or posts will be increased in number and be more scattered, thus affording near-by supplies for prospecters working in fields distant from the old river stations. The prospecting of the country has thus far been kept within certain limits, owing to the difficulty of obtaining provisions except at a few points along the river.

It must be remembered that the only points of supply are along the main Yukon River where the steamboats ply. None of the numerous large tributaries have any steamboats or any supply stations above the mouth. Even at such prominent points as Circle City and Forty Mile, the trading stations and stores are on the main Yukon River, and all supplies have to be packed from 60 to 75 miles to the diggings, thus largely increasing their cost. This packing is generally done on the backs of the Indians or those of the miners themselves.

The boggy nature of the country makes it impassable for pack animals in summer, and hay and grain are practically unobtainable. In the winter transportation from place to place is by dog sleds and in the summer all travel is by water, there being numerous streams tributary to the river and its branches.

The discovery of the deep and exceptionally rich auriferous gravel in the gulches of the creeks in the Klondike section will have a marked effect on future prospecting in the placer mining portions of Alaska in more respects than one. Most of the prospecting has heretofore been on bars of rivers or in shallow placer grounds, workable only in summer. In fact mining in "summer diggings" has been the rule.

At Forty Mile and Birch Creek there has been some deep gravel mining, where burning the frozen ground has been resorted to; but, generally speaking, there has been comparatively little work done in the way of what may be called the deep gulch diggings.

Working this latter class of ground involves thawing and getting out the gravel in winter and washing it when the water flows in the spring. In this way the claim is worked the whole year round, instead of only a few months in summer, as has been the case with the ordinary summer diggings. The men, therefore, stay all winter and do not come out in the fall to return in the spring, as many of those have done who worked the ordinary placers in the Yukon districts. These deeper claims, worked by drifting under muck banks and thawing the frozen gravel by means of log fires are very productive. By working them in this manner the mining season in the Yukon region is materially lengthened, the removal of the gold-bearing gravel being accomplished in winter and its washing in summer.

Different kinds of ground are now looked for than formerly. It is worthy of note that the experienced prospectors from Forty Mile and Circle City, who went up to the Klondike, did not believe the ground on El Dorado, Bonanza, and other creeks was worth much of anything. Some returned to their camps without making locations and others

took up claims and left them. The wide ravines looked like "Moose pastures," covered with soggy moss as they were. "Old timers" in Alaska would have passed such places by, and indeed had passed over these creeks for years. The writer while in Alaska met a man who had mined for some years in that region, who the year previous to the discoveries on the Klondike had a wood-cutting contract in that river which took him six or eight months. During that period he was many times on El Dorado, Bonanza, and other gulches, but confessed that he never saw anything in the surroundings to lead him to think of finding gold; so he did no prospecting.

Such rich ground has of late been found in these wide canyons or valleys, in the flats, and on the benches or high sides of the ravines, that prospecting is no longer confined to the narrow creek beds, as was formerly the case. In fact, gold has been found in many places where no prospector would ordinarily think of looking for it. The knowledge of these facts has caused the prospectors to seek for gold in localities heretofore passed over and given them much wider range of possibilities in their work.

In the year 1897 comparatively little prospecting was done on the American side of the boundary line along the Yukon River, as most of the men, attracted by the rich discoveries in the Klondike district, went up the river and scattered in the region of Northwest Territory adjacent to Dawson. The only exception was in the case of Manook Creek, which empties into the Yukon almost 75 miles below Fort Hamlin. A little surface mining has been done here for a year or two, but with no great results. However, about August, it was learned that heavy, coarse gold had been found on bed rock, on both Hunter and Little Manook creeks, tributaries of Manook; and many persons, on their way to Dawson on the river boats, stopped and began prospecting and taking up claims. Others that went up as far as Fort Yukon, and could proceed no farther in the steamers on account of the low stage of water, returned to Manook district. A number of miners from Birch Creek district also went down to the new district, and by the end of September there were some 300 men at the place, and a town called Rampart City was established. This place is, approximately, halfway between St. Michaels and Dawson, and the only mining camp of any moment on the river below Birch Creek. The principal tributaries where gold has been found are Little Manook, 8 miles long; Hunter, 30 miles long, and Hoosier Creek, 21 miles long. Other tributary creeks are: Gold, Hamilton, Chapman, Korkorine, North and South Forks of Manook, Granite, Slate, Ruby, Spring, and Branch. All these streams were being prospected in the winter of 1897–98. A short distance down the river is Stevens Creek, and some 20 miles up is Alder Creek, on both of which gold has been found.

Nothing of note has been proven of the extent of the Manook district in the fall of 1897, as it was impossible to get to bed rock until the winter freeze came, so all prospecting was left for the winter. Since

that time, while rumors of the richness of the camp have been heard, nothing very definite has been received up to this writing, though many men went to the district from other parts along the river in the winter, attracted by news of rich strikes on the creeks.

There remains a vast amount of available prospecting area along the larger rivers in Alaska and their tributaries. Most of these have been, mainly, only visited in search of bar diggings. Little has been done upon these since the possibilities of deep gulch diggings in Alaska and Northwest Territory have been proven. There are several very large rivers emptying into the Yukon which will doubtless be thoroughly prospected during 1898, notably the Kouyoukuk, Porcupine, and Tanana rivers, with their numerous tributaries and branches.

As there are no supply stations along these rivers and no steamers plying on their waters, most of the prospecting heretofore has generally been done in the summer months. Bed rock in the deeper diggings can only be reached in winter, when the ground is frozen and water does not interfere. The men who have "poled" their boats up these side streams from the main Yukon in summer have been unable, with few exceptions, to remain over the winter far from a base of supplies, so that only desultory prospecting has been done, and that mainly for shallow diggings.

The Kouyoukuk is a very large stream with many tributaries, very few of which have been prospected to any extent. At present there are no mining camps anywhere along the river. The Porcupine, which enters the Yukon at Fort Yukon, within the Arctic Circle, heads far to the north, and has been more or less prospected, but with ill success.

It is probable that the miners have been generally unable to reach bed rock where it is any depth, as the work has been mainly done in the summer. The winter prospecting of 1897-98 should bring good results, as the men will now be sure to sink deep enough to prove the value of the gravel on bed rock in the creeks, side streams, or gulches. The Tanana heads far up near the divide, on the opposite side of which are the head waters of Forty Mile Creek. It has been very little prospected, though there are reports of gold discoveries at several points in its course.

The Kuskoquim River, which empties into the Bering Sea south of the Yukon River, has been very little prospected, and there are no white settlements aside from the missions. It is stated that native quicksilver has been found near the mouth of these streams and that Indians have brought in gold. The Copper River, which has attracted many parties of miners in the past year by reason of rumors of gold discoveries, empties into the Gulf of Alaska south of the Kenai Peninsula. Thus far no gold has been sent out from either the Copper or Kuskoquim rivers.

In the fall of 1897 gold discoveries of importance were made on the Kowak River at the head of Kotzebue Sound, which is just north of Bering Strait, in the Arctic Ocean. A number of small streams empty

into Kotzebue Sound, all of which are supposed to be gold bearing. Several expeditions for the Kotzebue Sound region fitted out at San Francisco and Seattle in the spring of 1898, so the region will be well prospected during the year. Many thousand people went over the trails in the winter of 1897-98 to the Klondike region, and large numbers of these will doubtless keep on down the Yukon into American territory. Thousands of others go up via St. Michael and the Yukon River in the spring, large numbers of whom will remain on the American side. While the majority of these adventurers will return after one summer, or one year in the country, there will still remain a large mining population, which will prospect and develop new districts throughout Alaska. Settlements will be established on the various rivers, so that prospectors will be able to obtain supplies more conveniently, instead of at what are at present distant points. There is room for many thousands of miners and prospectors; but only those of the finest physical strength should venture in a region where the cold is so great, the hardships so many, and the character of food so trying to all but the best constitutions.

More or less quartz has been found in the Yukon region, but thus far none of it has been worked. Some very wide ledges of low-grade ore are reported, but the quartz will not bear shipment, and there are no mills.

On Unga Island and on Douglas Island, as well as the mainland of southeastern Alaska, quartz properties continue to be worked on a large scale and with success and profit. On Douglas Island, particularly, the largest mills in the United States are located, and they are being still further enlarged as developments in the extensive ore bodies warrant the expenditure.

The placer mines at Cooks Inlet were worked and produced in 1897, but did not attract so much attention as in the previous year, the newcomers to Alaska all going off to the Yukon region. The auriferous beach sands of Lituya Bay continue to be worked, but not on a very large scale.

The rate of wages paid to miners varies to a very great degree in Alaska, and it is impossible to give even an approximate estimate of the number of men engaged in mining. In some placer camps only summer work is done, and the men come and go with the season. In all the placer camps the men are mainly working for themselves, and along the Yukon River in 1897 wages went up as high as $15 per day, or $1.50 per hour. In places only $10 per day was paid, but the higher rate attracted hundreds away across the border to British territory mines.

In the quartz mines at Berners Bay, southeastern Alaska, there are about 75 men working for the companies, at wages varying from $2.50 to $3.50 a day. At Cooks Inlet those who were working for wages received $4 per day, but most of the men worked on their own account.

At the Douglas Island quartz mines 366 men received from $2 to

$3.50 per day, with board and lodging. In the quartz mines of other parts of southeastern Alaska wages vary from $3, $3.25, $3.50, to $4 per day. At the beach sand-mines men are paid $40 per month of twenty-six days of ten hours each, with board, or $50 per month and board for the short mining season of five or six weeks. At Unga Island there are 115 miners earning an average of $3.50 per day. It is impossible to say how many men are employed in mining around Circle City, Forty Mile, Manook, or other Yukon districts, so nomadic and changing is the population of those camps.

As to distribution of sources of gold the returns show that $1,760,793 was derived from quartz and $678,789 from placer mines.

Of the silver $27,021 is known to have come from association with gold from quartz mines. The balance of $52,186 of the total silver was from ores or bullion treated at smelting works in San Francisco and Puget Sound and was doubtless from quartz also, there being no copper or lead mines worked in the Territory.

PRODUCT OF ALASKA, BY DISTRICTS, 1897.

RECAPITULATION.

District.	Gold.	Silver (commercial value).	Total.
Berners Bay	$185,000	$500	$185,500
Cooks Inlet	191,300	.....	191,300
Douglas and Unga islands	1,238,082	25,773	1,263,855
Juneau	86,300	248	86,548
Lituya Bay	17,000	.....	17,000
Norton Sound	15,000	.....	15,000
Silver Bow Basin	225,000	.....	225,000
Sum Dum	31,890	500	32,390
Yukon River	400,000	.....	400,000
Territorial	50,000	.....	50,000
Undistributed	.....	52,186	52,186
Total	2,439,572	79,207	2,518,779

GOLD FIELDS OF ALASKA AND THE YUKON RIVER.

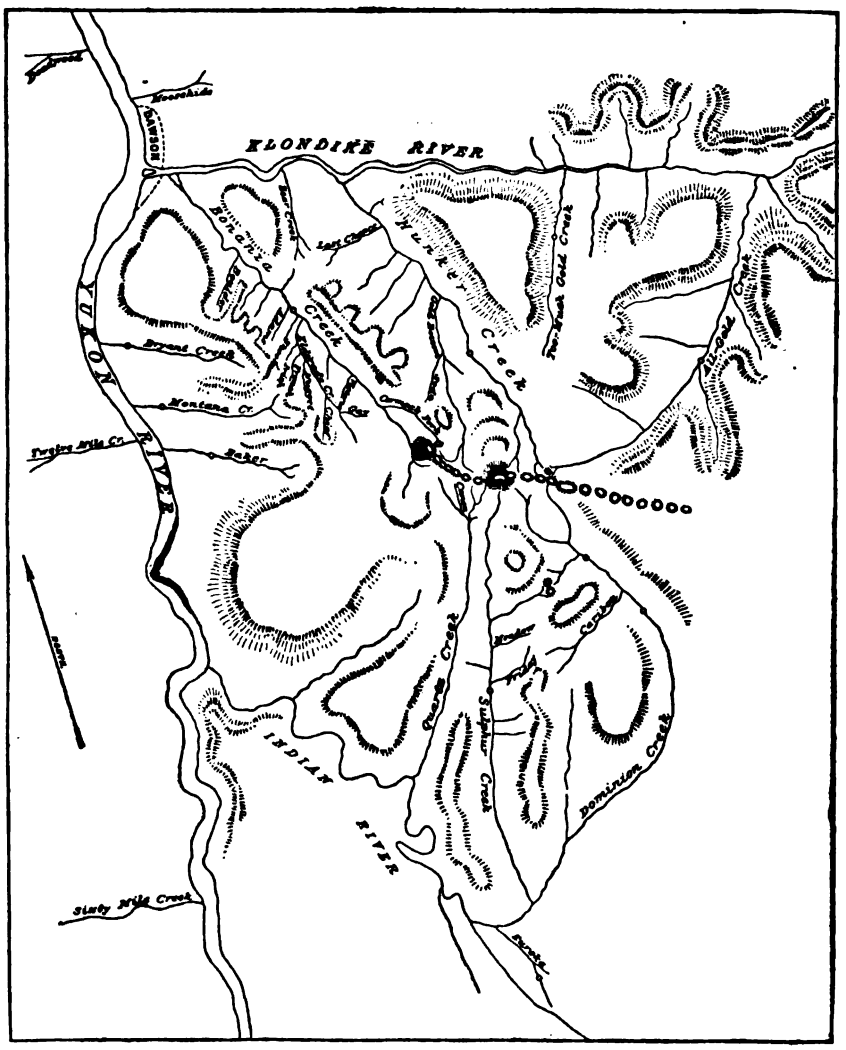
The following description of the gold fields and mining districts of Alaska and the Yukon River is extracted from an article written by Sam. C. Dunham, of the Department of Labor, who was assigned to this task by the Commissioner of Labor and visited the several fields in the fall of 1897:

THE KLONDIKE.

The Klondike River enters the Yukon from the southeast 6 miles above old Fort Reliance. It is about 150 miles long and has its source in a high range of mountains which separates it from the Stewart River and its tributaries. At its mouth an island divides the stream into two nearly equal channels, each of which is about 150 feet wide and 4 or 5 feet deep, at a medium stage of water. The stream is very swift and rapids occur at frequent intervals, making it exceedingly difficult to navigate with canoes. Its waters are clear and shallow. It has been known for many years as one of the best streams in the country for salmon fishing, and during the season large numbers

of Indians camp on its shores for the purpose of catching and drying salmon. For several years gold has been known to exist on the main stream, but it has never been found there in sufficient quantities to justify working under present conditions as to cost of supplies.

The original discovery of gold in paying quantities in the Klondike district was made by George W. Cormack, who came to the Yukon country twelve years ago



KLONDIKE MINING DISTRICT, NORTHWEST TERRITORY.

from Wisconsin, and who had been engaged in prospecting and in trading with the Indians and miners at various points on the river. On June 22, 1896, Cormack and Loren Cooper left Forty Mile for the mouth of the Klondike. It was Cormack's intention to spend the summer in fishing on the Klondike, while Cooper proposed to develop two quartz leads situated just below the mouth of that stream on the west side of the Yukon and directly opposite the present site of Dawson. They were

thus engaged in the early part of August, when Robert Henderson, an old-time prospector, came down the Klondike and told Cormack that he had found on the head waters of Gold Bottom Creek some ground that would pay 15 cents to the pan.

Cormack accompanied Henderson to Gold Bottom, but not being favorably impressed with the prospects returned alone to the mouth of the Klondike, coming down the creek now known as Bonanza. On his way back he prospected on various tributaries of Bonanza, and on the main creek itself, and finally at a point about 12 miles above the mouth, he found gold in sufficient quantities to justify him in locating, and on August 17, 1896, he staked two claims, as he was allowed to do under the law—one now known as "Discovery" and the other as "No. 1 below Discovery"—and gave to the creek the name it now bears. From Discovery down to the mouth of the creek he found fair prospects at various points on the bars and in the rims, panning out altogether $5 or $6 in coarse gold, the largest nugget weighing $1.10. Cormack informed Cooper and others of his discovery, and left on August 19 for Forty Mile for the purpose of recording his claims, which he did on August 26, 1896. Cooper, Edward Monahan, and Gregg Stewart staked on the 19th, locating the claims now known as 27, 28, and 29 below Discovery. William Stanton, on the 21st staked what is now known as 13 below. In the meantime the news of the discovery had spread to Indian Creek, which flows into the Yukon from the eastward 30 miles above the Klondike, and fifteen or twenty men who were prospecting there left at once for the new diggings, while quite a number of men who were coming down the river in small boats were informed of the discovery and stopped to make locations. Three or four days after Cormack's arrival at Forty Mile a large number of men came up from that place in poling boats, and by September 1 there were 150 or 200 men on Bonanza and its tributaries seeking claims. By September 13 Bonanza had been staked to 45 above and 90 below Discovery, and as nothing of value could be found above or below those numbers, many men were forced to prospect on other creeks. On the date named a discovery was made at the mouth of the gulch now known as Eldorado Creek, which comes into Bonanza from the south about a mile above Discovery, and in three or four days Eldorado was staked to 32. This creek, which was staked because there was no other ground in the immediate vicinity to be had and which was not supposed to contain anything of special value, has proved to be far richer, though less extensive, than Bonanza, and is probably the richest creek, mile for mile, ever discovered in the world. In October about twenty men came up from Circle City on the steamer *Arctic*, and by April 1, 1897, some 800 had come up from that place, making the population of the Klondike district at the last-named date about 1,500. All who came into the district during the winter were compelled to bring their own supplies, as no freight was landed there by the commercial companies until early in the following June. A large proportion of the miners and prospectors lived in tents, only about thirty cabins being built on the gulches during the winter.

Up to November 3, 1896, no great strike had been made on either creek, but on that date rich ground was opened up on 21 above Discovery, on Bonanza. The first pan taken out immediately below the muck yielded 35 cents, and the next seven fires gave an average of $3.35 to the pan. From this strike dates the "boom" on the Klondike. At that time Eldorado had shown no large prospects, but a few days later very rich ground was opened up on 14 and 15, as high as $18 being taken from a single pan. During the same month a big strike was made on 6, which yielded as high as $22 to the pan.

On Hunker Creek gold was discovered in September, 1896. This creek has developed some good properties, and in October, one month later, claims there were worth more than on Bonanza and Eldorado.

During the early part of the winter but little work was done on the gulches beyond the sinking of prospect shafts by the claim owners themselves, as it was impossible to induce men to work for wages. Every man who had an outfit believed

that he could do better by taking his chances of finding a good claim than by working for the wages offered ($15 a day), and a large number of men spent the fall and the early part of the winter in prospecting the tributaries of the Klondike and Indian rivers and numerous gulches along Bonanza and Eldorado creeks. By the middle of January (1897) many of these prospectors had become discouraged through failure to find good claims and took "lays"* on Bonanza and Eldorado, and later a large number accepted employment for wages, principally on Eldorado. Drifting was prosecuted vigorously until the water began to run in the creeks, about May 7, when the work of shoveling the dumps into the sluice boxes was begun. Most of the dumps were exhausted within thirty days and many marvelous clean-ups made. On some claims the gold filled the riffles so rapidly that it was necessary, in order to save the gold, to clean up as often as twice a day. On 2 Eldorado, with four men shoveling in, $6,500 was taken out in one day. By the first week in June the winter's work was practically closed, and five months' active mining operations, conducted by a force of about 600 men, had produced an amount of gold which is conservatively estimated at $2,000,000. Work was continued through the summer on most of the claims, ground sluicing and shoveling in being actively engaged in on Bonanza until the creek froze up in the latter part of September, and on Eldorado until the latter part of August, when the water got too low to furnish a sluice head. The output for the summer brought the total product for the season up to about $3,000,000. Much "dead work" was done, consisting of removing the trees, stumps, moss, and muck, and in ground sluicing and otherwise getting ready for active operations the following season.

On September 30, 1897, Bonanza Creek had been staked above and below Discovery for a total distance of about 20 miles, while Eldorado Creek had been staked for a distance of about 8½ miles, both being located for almost their entire length. These are all creek claims, 500 feet long as a rule, measured in the direction of the general course of the stream, and extending in width from base to base of the hill or bench on each side. In making their original locations prospectors who were not provided with tapelines stepped off the distance and set their stakes at what they considered the limits of their ground. When the Government survey was made it was often found that more ground was claimed than the locators were entitled to, and thus "fractions" were created. There are quite a number of these on the various creeks, and some of them have proved very rich. At the above date there were also 50 bench claims on Bonanza and 40 on Eldorado. The bench claims are 100 feet square and can not extend below the "base of the hill or bench." The Canadian mining regulations are not clear as to the line of demarcation between creek and bench claims, and as a consequence some dispute has arisen as to where the creek claims cease and the bench claims begin; but these disputes are generally amicably settled between the parties themselves.

The method of placer mining pursued in the Klondike district is somewhat different from that which prevails in the United States. The ground, which is covered with moss to a depth of from 12 to 18 inches, is frozen solid from just below the moss to bed rock, which is generally struck at a depth of 10 or 15 feet, although in many places it is 25 or 30 feet below the surface. The heat of the sun, even in the hottest days of summer, when the thermometer registers 100° in the shade, has no effect on the frozen ground until the moss is removed. Beneath the moss there is a deposit of decayed vegetation called by the miners "muck," which varies from 2 to 20 feet in depth.

Where the ground is very deep it is found more economical to sink a shaft to bed rock and take out the pay gravel by means of a windlass. This is called "drifting,"

* "Lay" is the term used by the miners to designate ground worked on shares. A lay usually consists of a strip 50 or 100 feet in width, intersecting the general course of the stream at right angles and extending clear across the claim. The usual terms are an equal division of the output, the lessor paying all expenses of operation.

and in many claims this can be done successfully only in the winter time, after the stream is frozen solid, as in the summer time the inflow of surface water and seepage from the creeks make it impossible to pursue this method. After stripping off the moss, the miner starts a shaft about 3½ by 6 feet, picking through the muck until the gravel is reached. He is then obliged to resort to "burning," as the best pick does not hold its point five minutes when used in the frozen gravel. A fire of cord wood is built on the bottom of the shaft, which thaws the gravel to a depth of about 2 feet. This thawed gravel is then shoveled out or hoisted by means of a windlass, and the process repeated until bed rock is reached. At this stage the "drifting" proper begins. Dry wood is piled against the wall of the shaft to nearly the height of the pay gravel and covered with sticks of green cord wood arranged with one end resting on the bottom of the shaft and the other leaning against the wall at an angle of 45°. The green wood so placed is called "lagging," and serves the double purpose of confining the fire and catching the waste dirt from above. At bedtime the fire is started and the miner retires for the night. During the night the heat causes the wall to cave, and the gravel which slides down over the lagging produces a smoldering fire, which burns till morning and thaws the face of the gravel to a depth of 2 feet or more. In the morning the miner enters the shaft, throws back the waste dirt and charred wood, and hoists the pay gravel to the surface. This process is repeated daily, the miner panning after each fire to see if he is still on the pay streak. As the work progresses the drift gradually widens out until a width of about 30 feet is attained, and is then carried forward at a uniform width. On account of the gas produced by the burning wood, ventilation is necessary, and this is secured by sinking a second shaft at a distance of 20 or 30 feet from the first and connecting them as quickly as possible. On account of the frozen condition of the ground, timbering is unnecessary, but the expense thus saved is more than counterbalanced by the consumption of firewood in burning. On many of the claims on Bonanza and Eldorado the wood has been cut off to the top of the range on either side, and within a year or two wood will have to be brought from a distance, which will greatly increase its cost. In the spring the dump taken from the drifts is shoveled into sluice boxes and the gold thus separated from the gravel.

In the shallower claims ground sluicing is resorted to during the summer months. When the pay streak has been located the moss is stripped off, a trench is dug parallel with the creek along the pay streak, and the water from the creek is turned into the head of the trench by means of a wing dam. The action of the water in passing through the trench undermines the banks and washes the muck and much of the gravel into the bed of the creek below, the coarse gold in the gravel thus carried away being left in the bottom of the trench. After the trench has been washed out to a sufficient width a line of sluice boxes is set through the center of the trench, a head of water turned on, and the gravel shoveled in from either side. The sluice boxes are given enough fall to carry the gravel and sand through the boxes into the "tailings" pit below, the gold dropping to the bottom and lodging in the riffles, which consist of longitudinal strips arranged about an inch apart and having cross strips at frequent intervals. Some of the ground, especially on Eldorado, is so shallow that it is found profitable after removing the moss, to shovel it all into the sluice boxes, thus avoiding the expense and delay of drifting and ground sluicing.

The following details relative to the output of the claims on Bonanza and Eldorado, the number of men employed, wages, etc., present a fairly accurate idea of the value and productiveness of the mines:

BONANZA CREEK.

Discovery and 1 below were well opened up last winter (1896–97), and a pay streak from 30 to 100 feet wide was located. The ground yields from $2,000 to

$2,500 to the box length,* and $40,000 was cleaned up in May as the result of the season's work, eight men being employed.

All the claims from 2 to 10 below run about the same as Discovery and 1 below, there being very rich spots on 3, as high as $3,000 to the box length having been taken out last spring. About ten men were employed for wages on these claims.

From 10 to 20 below, the ground is very rich, producing in places $4,000 to the box length, and the pay streak is 600 feet wide on several of the claims, having been located for a width of 700 feet on 16, with fair pay all the way across.

From 20 to 30 below, the pay streak is very wide, and the ground runs $2,500 to the box length.

In the 30's, very little has been done, the output not amounting to over $10,000 probably. As high as $2,000 to the box length has been taken out and the claims promise large returns.

The 40's run about the same as the 30's, but very little work has been done.

From 50 to 59 the ground yields from $1,500 to $2,000 to the box length. In places the pay streak is 600 feet wide, and the yield is likely to be large. No. 51 produced $50,000 or $60,000 during the summer, ground sluicing, employing twelve men.

In the 60's, good pay was taken out last winter. No. 60 was bought for $10,000, and afterwards a half interest was sold for $10,000, the seller reserving the dump and washing out $4,500 therefrom. The ground ran about $2,000 to the box length.

The claims above Discovery run about the same as those below. From 1 to 18 above the ground runs about $2,000 to the box length. No. 5 produced $49,000 during the season, two box lengths yielding $16,000. A half interest in this claim was sold last October for $35,000 cash. Some sixty-five men were employed on 5 at one time during the summer.

No. 21 above is one of the best claims on Bonanza, running as high as $4,000 to the box length. The first rich strike on Bonanza was made on this claim.

From 21 to 26 above very little has been done.

On 26 some big clean-ups were made, over $100,000 having been taken out last summer by ground sluicing. A half interest in this claim was bought last winter for $40,000, including a half interest in 18 above and a quarter interest in 34 Eldorado.

No. 27 sold for $55,000 last spring, the purchaser taking out enough in two months to pay for the claim. The entire output for the season was $75,000. No. 28 belongs to the same parties as 27 and is equally rich.

No. 29 has turned out from $3,000 to $4,000 to the box length.

No. 36 has been very productive, and 37 produced last winter between $45,000 and $50,000.

No. 38 has turned out very well, as high as $3,000 to the box length, and yielded about $20,000 as a result of the season's work.

From 39 to 44 the ground is good, 41 having produced $20,000 the past season. Very little has been accomplished above 44. In the 50's there has been considerable prospecting, but nothing has been found to justify working at the present rate of wages and cost of supplies.

The bench claims on Bonanza, from the mouth of Eldorado, which comes in about a mile above Discovery, to 60 below, have shown up well, some of them being very rich. From a bench claim at the mouth of Skookum Gulch, which enters Bonanza about half a mile below Eldorado and nearly parallel with the latter stream, one man washed out $500 a day with a rocker for a short time during the last summer.

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* The sluice boxes in use in the Klondike district are constructed of inch lumber, and are 12 feet long and 12 inches deep, being 12 inches wide at one end and 10 inches wide at the other, so as to fit into one another. In running a string of sluices the gravel is shoveled in from either side to a width of 6 or 7 feet, making a cut about 14 feet wide. A box length, therefore, is a superficial area 12 by 14 feet, or 168 square feet.

Along the upper end of 6 below three or four of the bench claims are very rich, one man having rocked out $10,000 last summer. He was offered $10,000 for his claim when he ceased work, but refused the offer. Between Eldorado Creek and Skookum Gulch there is a divide two or three hundred feet high, and pay has been found all the way to the top on both slopes. On the summit washed gravel is found, producing $1 to the pan in coarse gold. The deposit has all the characteristics of an ancient river bed and has been traced along the ridge for several miles. It is supposed to extend around the head of Eldorado and over to the head of Dominion Creek, where very rich ground was discovered during the past fall. There are many evidences that the wash which produced the present rich deposits of gold in the Klondike district came from this ancient river bed.

All sales so far reported on Bonanza have been made between miners, the money for the payments being borrowed by them from one another. The largest price that has been paid for a single claim on Bonanza is $55,000. No. 7 above was originally purchased for $7,000, and a quarter interest was afterwards sold for the same amount, or at the rate of $28,000 for the claim. A half interest in 6 above was sold for $10,000 early last spring. Many other sales are reported, but these are typical.

ELDORADO CREEK.

The fraction at the mouth of Eldorado is very rich, the dump taken out during the winter having produced $25,000. Five men were employed in making this output.

No. 1 produced $19,000 as the result of the winter's drifting. The work was begun in February, four men being employed. The claim produced $30,000 during the summer, employing fourteen men.

Fourteen men, drifting from February to May on 2 Eldorado, took out a dump which yielded $100,000. Four men working on a lay on the same claim took out $49,000, being employed from January 27 to May 1, and 2 other men working on a lay produced $32,000, being employed about the same length of time.

Nothing has yet been found on 3, although it is supposed to be rich.

From the fraction of 140 feet between 3 and 4 about $4,000 was taken out, 2 men being employed on a lay. The claim sold for $14,000 last February.

No prospecting has been done on 4, but it is probably as rich as the claims immediately above and below.

The upper part of 5 and the lower part of 6 produced about $130,000, the result of drifting last winter, 16 or 18 men being employed, beginning work late in February. During the summer $50,000 was taken out, 12 men being employed. The pay streak is fully 300 feet wide here, extending clear across the gulch.

On 7, 5 men were employed for a short time, and they took out $31,000 in 4 box lengths.

The pay streak is 300 feet wide on 8, and with 15 men working produced $100,000.

No. 9 is very rich, and produced between $70,000 and $100,000 from two holes, employing 9 men. Some very large pans were taken out of this ground, as high as $212 being reported. From 3 buckets of gravel (15 pans) $1,500 was secured.

No. 10, a half interest in which was sold last winter for $15,000, yielded $20,000 as the result of drifting last winter, and $30,000 was taken out during the summer, 3 men being employed.

A clean-up of $26,000 was made on 11, and from two cuts $60,000 was taken out by 5 men. The pay streak is wide here.

No. 12 produced about $35,000. This ground is very rich. A great deal of dead work was done on it during the summer in preparation for this season's work.

No. 13 has been very productive, probably $100,000 having been taken out, with 6 men employed.

Nos. 14 and 15 produced about $120,000, drifting, with 2 or 3 men employed

Six men, drifting, took out $80,000 on 16.

No. 17 has shown good results, having produced nearly $100,000. Work was begun in February, 9 men being employed.

From 18 to 23 not much has been accomplished, although all the claims show good prospects.

No. 23 was bought for $25,000 last winter, and the purchaser, working 6 men, took out enough in two months to pay for the claim.

No. 25 has produced about $30,000, employing 5 men drifting from February 1 to April 10. Eight box lengths yielded an average of $2,000 to the box length.

Very little work has been done on 26, although the prospects are good.

From two small dumps on 27 about $30,000 was taken out, with 3 men employed.

The fraction of 55 feet between 27 and 28 yielded from a small dump between $6,000 and $8,000, with 3 men employed.

Nothing has been accomplished on 28, although it prospects well.

Last summer $38,000 was taken out of 38 linear feet on 29, 6 men being employed. The owner was offered $120,000 for 120 feet on the upper end, but he refused the offer.

No. 30 is the great claim of Eldorado. It has produced as high as $20,000 to the box length. About $150,000 was taken out of two cuts—12 box lengths in all, or about $70 to the square foot. The pay streak is 40 feet wide. At one time during the spring the owner could go into the workings and take out a pan of dirt from bed rock and get from $800 to $1,000 to the pan. Six men were employed on 30 during the winter, drifting, and about 30 men were employed during the summer.

There is a small fraction between 30 and 31 which has yielded about $30,000. The best pay is found under the banks along here.

The original locator of 31 sold it for $80, and it was afterwards sold for $31,000, one of the first big sales made in the district. Eight men were employed on the claim from April until just a little while before the close of the season, when the water became so low that they had to cease work. They uncovered some very rich ground, and it is thought that 31 will prove to be one of the best claims on the creek.

On 32 big prospects have been found, but not much work has been done.

Up to September 29, 1897, nothing had been found on 33, but on that date a strike was made which yielded $10 to the pan, and the claim promises to be very productive.

No. 34 shows good prospects, but no rich ground has been struck. About 9 men were employed on the claim during the summer.

Nothing has been done on 35.

Six men were employed on 36 during the winter, drifting, and from $4,000 to $5,000 to the box length was taken out. Some work was done during the summer, and the claim has yielded between $40,000 and $50,000. The largest nugget as yet found on the Yukon was taken from 36. It weighed about 34¼ ounces, and was valued at $583.

No. 37 shows up about the same as 36, and will probably prove as productive.

The claims on Eldorado above 37 have not shown any very promising prospects at the present writing.

The bench claims on Eldorado were not worked to any extent last winter, and it was difficult to prospect them during the summer, on account of the inflow of surface water. But they will be thoroughly prospected this winter, and it is probable that they will prove very rich, as gold has been found in paying quantities wherever a shaft has been sunk to bed rock.

October 1, 1897, 18 creeks had been located in the Yukon district of Canada. The following table shows the names of the creeks, the number of claims above and below Discovery, the number of bench claims, and the mining districts in which the creeks are located:

NAMES OF CREEKS, WITH NUMBER OF RECORDED CLAIMS, IN THE YUKON DISTRICT OF CANADA, OCTOBER 1, 1897.

Name of creek.	Above Discovery.	Below Discovery.	Bench.	Mining district.
Last Chance	41	7	.....	Klondike.
Bonanza	115	68	.....	Do.
Bear	24	26	.....	Do.
Eldorado	90	.....	40	Do.
Hunker	50	87	1	Do.
Victoria	20	.....	.....	Do.
French	41	.....	.....	Do.
Isaac, or Chief	10	.....	.....	Do.
Skookum	13	.....	30	Do.
All Gold	12	52	.....	Do.
Sulphur	72	68	.....	Indian Creek.
Dominion	50	75	.....	Do.
Eureka	36	35	.....	Do.
Montana	35	8	.....	Montana Creek.
Moose Hide	38	5	.....	Moose Hide.
Bryant	35	11	.....	Bryant Creek.
Deadwood	37	28	.....	Deadwood Gulch.
Henderson	43	34	.....	Henderson Creek.

In explanation of this table it should be stated that the Canadian mining regulations differ somewhat from the mining laws of the United States in the definition of a "mining district" (or "locality"). Under our laws and local regulations a separate mining district may be established on every creek where a discovery is made; whereas under the Canadian mining regulations, "locality" shall mean the territory along a river (tributary of the Yukon) and its affluents. To illustrate: The Birch Creek district, in Alaska, consists of eighteen or twenty separate mining districts, each having its recorder and records, while the Klondike mining district (or locality) embraces the Klondike River and all of its tributaries, and is subject to the authority of a single official, the gold commissioner, who has jurisdiction over the Yukon district of Canada.

Some complaint is heard of the Canadian mining regulations* in force in the Yukon district, but it must be said in their behalf that in one respect they are considered more favorable than our own laws to the poor man seeking a claim for the purpose of working it. Under the Canadian law a prospector can locate but one claim in a district (or locality), and as he is required when he records to certify under oath that he has found gold in paying quantities, the effect is to prevent the location of creeks before they are properly prospected. This is certainly a provision that gives all a fair chance. Under the United States law† a prospector can locate any number of claims in a district, if he so desires, provided he is not prohibited from doing so by local mining regulations. It may be added, however, in this connection that in order to hold the possessory right to a location, not less than $100 worth of labor must be performed or improvements made thereon annually until entry shall have been made.

No remarkable discoveries have been made in the Yukon district aside from those on Bonanza and Eldorado, detailed above.

*A pamphlet giving the regulations governing placer mining in the Yukon district of Canada may be had free upon application to J. A. Smart, esq., deputy minister of the interior, Ottawa, Ontario, Canada.

†A pamphlet giving the United States mining laws, and regulations thereunder, may be had free upon application to the Commissioner of the General Land Office, Washington, D. C.

Skookum Gulch, which enters Bonanza from the south half a mile below Eldorado, is staked to 13 above its mouth, where the original discovery was made, and contains 30 bench claims, some of which are very rich. The creek claim at the mouth of Skookum Gulch was staked last March and was sold shortly afterwards for $35,000. The purchasers cleaned up $37,000 during the summer and then sold a half interest for $35,000. Nothing noteworthy has been accomplished farther up on Skookum, but the ground prospects well and will undoubtedly prove rich, as it drains the western slope of the divide, containing the ancient river bed previously referred to.

French Gulch, a tributary of Eldorado, has not been developed to any extent, although $5 to the pan has been secured from a fractional claim at its mouth.

Bear Creek, a tributary of the Klondike, contains 50 creek claims, some of which prospect well. One claim which was worked last winter yielded from $1,500 to $2,000 to the box length.

Hunker Creek, which flows into the Klondike from the south a few miles above the mouth of Bonanza, has 137 creek claims and 1 bench claim, and is reported to contain much good property.

No promising prospects have been found on any of the other tributaries of the Klondike. It is a remarkable fact that all the gold-bearing creeks thus far discovered on the Klondike come into that stream from the south, and the same statement is true of Bonanza and Eldorado.

Several creeks have been located outside of the Klondike district, as indicated in the foregoing table, but no noteworthy developments have been made. Dominion Creek, a tributary of Indian River, has shown some very fine prospects, and as it heads just across the divide from the head waters of Eldorado, it is thought that it may prove productive.

Late reports from Henderson Creek, which enters the Yukon from the east just below Stewart River, indicate that good ground has been found there, 35 cents to the pan having been obtained on the benches. It was impossible during the summer to reach bedrock near the creek on account of the water, but it is probable that good pay will be found there during the winter.

In the short time available it was impossible to interview all the claim owners on Bonanza and Eldorado. The amounts given above as the output of the various claims designated aggregate nearly $2,000,000, and as most of the claims for which the output is not given (some 125 in number) produced from $1,000 to $10,000 each, it is safe to say, as before stated, that the mines of the Klondike district yielded during the season of 1896-97 nearly $3,000,000—a most extraordinary figure, when it is considered that the period of active operations on most of the claims was less than eight months and that probably less than 600 men were engaged in productive mining operations. The claims on Bonanza were worked almost entirely by the claim owners themselves and by miners who took lays on the claims, and it is probable that not over 100 men were working for wages on the creek at any one time. The claims on Eldorado were worked principally by the claim owners personally and by miners employed by the day, the owners being averse, on account of the extraordinary richness of the ground, to letting it out on lays. The best obtainable data place the number of men working for wages on Eldorado at any one time at 300, and it is probable that one-half of this number would represent the average for the eight-month period of active operations. There is no doubt that the output would have been doubled if it had been possible to secure miners, but, as intimated elsewhere, a man who was supplied with provisions could not be induced to work for wages, and those who did accept employment worked only long enough to earn a "grub stake," when they ceased work and went into the hills to prospect.

While the output appears large, it should be borne in mind that the expenses of operation are enormous. Sluice-box lumber costs $150 a thousand feet in Dawson, and the rate for packing to 36 Eldorado, a distance of 16 miles, is $80 a thousand, and proportionately more for greater distances. In the summer it costs 35 cents a

pound to pack provisions from Dawson to 36 Eldorado, the winter rate being 8 cents a pound.

The summer trail from Dawson to the mines is a mere footpath, which winds its way over a steep mountain for a distance of 2½ miles, where it strikes the Klondike, which is crossed by means of a ferry and then traverses the valley of Bonanza Creek for 2 or 3 miles farther. It then alternately ascends and descends benches from 100 to 300 feet high and meanders through the valley. Where the trail keeps to the bottom lands one sinks to the knee in the muck at nearly every step, while it is necessary constantly to be on the alert to avoid a bad stumble over the roots, which protrude from the ground and cross the pathway in every direction. Rubber boots are indispensable, but their weight adds to the discomfort of the journey. When the trail leaves the bogs and ascends the hillside, some relief is experienced so far as the muck is concerned, but the roots are still there, supplemented by smooth bowlders, on which one is apt to slip and fall, while the exertion required to climb the steep incline tries the stamina of the strongest man. The unhappy traveler's misery is accentuated to the verge of distraction by myriads of mosquitoes, probably the most energetic and vindictive of their kind thus far discovered on this continent. After a journey over the Bonanza trail the mind reverts to the struggle over Chilkoot Pass as a mere pleasure jaunt and to the soul-harrowing experiences on the Skagway trail as a summer outing. In passing down the trail men are met at frequent intervals carrying from 100 to 150 pounds on their backs, and one falls to wondering why instead of packing for 35 cents a pound they do not strike for $1. Horses and dogs are also used for packing, a good horse carrying 200 pounds and a dog 35 to 50 pounds. In the winter, after the creeks and the Klondike freeze over, provisions are freighted to the mines by means of sleds, drawn by horses, dogs, or men, and the rate is about one-fourth that for summer packing. These rates, added to the excessive prices paid for supplies in Dawson, make the cost of living and the expense of operating the mines enormous.

If a visitor to the gulches prefers to ride, he can secure a saddle horse in Dawson for $60 a day.

During the past summer thirty or forty well-constructed log buildings were erected on the north side of Bonanza, opposite the mouth of Eldorado, the place being known as The Forks. The location is on bench land, with good drainage and a charming outlook. If provisions could have been obtained, there is no doubt it would have become a prosperous and growing town during the present season. The Forks must, in the nature of things, become an important point for the distribution of supplies, as it is in the heart of the gold-bearing zone of the Klondike district.

The question as to whether or not the mines of the Klondike district offer a safe and profitable field for the investment of capital is one to which many capitalists will have a satisfactory answer, through the medium of their experts on the ground, long before this report reaches the public, and, therefore, the facts here given will probably be of no value to them; but to men of small means seeking business opportunities, and to workingmen allured by the promise of large wages, it is hoped that the information contained in this and the succeeding section may furnish a basis for correct conclusions as to whether it is wise for them to venture into this country under present conditions.

With special reference to employment for wages in the mines, it should be stated, first of all, that the term "$15 a day" is misleading if unaccompanied by the explanation that payment for labor in the gulches is based on the unit of $1.50 per hour, and that at best employment is uncertain in the extreme, both on account of the climatic conditions and the difficulty of procuring supplies. During the summer months full time can generally be made, but the working season seldom exceeds seventy days. There is then a closed season of two or three months before drifting begins, the usual time for commencing winter work being about December 1. From that date to February 1 there is an average of but six hours of daylight, while the

temperature frequently drops to 60° or 70° below zero, rendering it difficult, if not impossible, to get in full time, the average time made during those months not exceeding six hours a day. Diligent inquiry among scores of miners who worked for wages during the past season failed to discover one who had made full time for one hundred and fifty days, the average probably falling below rather than above one hundred days. The cost of a year's outfit at the prices charged in the stores would be about $600, but if the stores are unable to supply a full outfit, as was the case last summer and has been the case nearly every year since the first settlement of the country, the miner is obliged to purchase from speculators and small traders sufficient supplies to make up the deficiency, at prices which bring the cost of his year's outfit to a figure more nearly represented by $1,000 than the first sum named. This enormous cost of living leaves the miner with little or no means after the purchase of his outfit to devote to other purposes. To support a family under such conditions is out of the question, and the only opportunity a miner has to better his condition is to work just long enough to pay for a "grub stake" and then go into the hills and prospect. If he makes a successful strike, he is prepared to pay the exorbitant prices charged for supplies, and can work his mine; if he fails, he may again go to work for wages or go out of the country and bring in an outfit over the trail, an alternative frequently chosen.

Even under the hard conditions prevailing during the past fall concerted action was taken to reduce wages from $1.50 to $1 per hour. On September 23 certain mine owners met in Dawson and adopted a resolution reducing wages to $1 per hour from October 1. The wage-workers met at the Forks on September 26 and adopted a counter resolution, declaring that wages would be kept at $1.50 per hour. If it had not been for the food panic, which is fully described under the head of Dawson, it is probable that the question would have come to an issue October 1, and with a large number of unemployed men in the country there is no doubt as to what the result would have been; but on account of the scarcity of provisions, supplemented by the fact that the only workingmen in the country even partially supplied were those already employed, the mine owners were forced, for the time being, to recede from their position. Many of the owners claim that it is impossible to operate their mines at a profit with wages at the present figure, and they are either working them in a very small way this winter or letting them lie idle, waiting for the reduction of wages which must inevitably come with an increase in the food supply.

It has been very difficult to secure any trustworthy estimates as to the probable output of the mines during the present season (1897-98). Many enthusiatic mine owners predict that it will reach $15,000,000, but the more conservative place it at from $8,000,000 to $10,000,000. The latest information received (December 15, 1897,) indicates that there are about 1,500 men engaged in mining on Bonanza and Eldorado, and as many more on other creeks in the Klondike district—a number that would probably have been doubled had it not been for the shortage of supplies. Up to December 15 no new developments had occurred in the district to change the opinion of those best informed that no creeks will be found to equal Bonanza and Eldorado in richness. In speaking of this subject an old practical miner says:

"Whatever may have been the cause that concentrated the gold in the two great creeks, it would seem that they have become rich at the expense of a vast tract of country which must, of necessity, be poor. Nor is there anything unnatural or unlikely in this. That it is so with the Klondike gold field has now become quite evident, and all the rich strikes that will ever be heard of from this part of the country have already been reported."

DAWSON.

About the 1st of September, 1896, Joseph Ladue, of the firm of Harper & Ladue, the owners of a trading post and sawmill at Sixty Mile, came down from that place and located the town site of the present town of Dawson, selecting a level plat of

ground on the east bank of the Yukon just below the mouth of the Klondike, and 55 miles east of the boundary line between Alaska and Northwest Territory. The sawmill was brought down from Sixty Mile and set up on the river front about a mile below the Klondike. Ladue erected the first house in Dawson, and had a small stock of goods transferred from the trading post at Sixty Mile. His supply of provisions, however, was inadequate to meet the demand, and many of the prospectors were obliged to go to Forty Mile and Circle City to procure outfits for the winter. The sawmill was put into operation at once, and has turned out about 2,000,000 feet of product, supplying the mines with sluice-box lumber and the town and vicinity with building material. But little building was done during the winter, the cold weather making such work impossible, but men were engaged in getting out logs for the construction of houses in the spring. On the 1st of January, 1897, there were only three or four houses in the town and but few men passed the winter there. As stated elsewhere, some 1,500 came into the district during the winter, but with few exceptions they passed up the Klondike and remained in the gulches till spring. By midwinter it was generally recognized that an extraordinary strike had been made, and as it was evident that Dawson would become the distributing point for the mines, there was an active demand for town lots. By the 1st of June 8 or 9 buildings had been erected on the river front, and there was a population of 500 or 600 in the town, living principally in tents.

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Numerous big clean-ups had been made in the gulches, and the town was flooded with gold dust, it being no uncommon thing to see a miner enter a saloon with a sack containg $3,000 or $4,000 in dust and leave it with the barkeeper, while he proceeded to "see the town," the sight usually proving so expensive that he had but a small balance to his credit at the bar when final settlement was made.

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FORTY MILE.

The first discovery of gold in American territory in the Yukon Valley was made in 1886 at Franklin Bar, on Forty Mile Creek, 35 miles above its mouth. This creek, which is about 250 miles long, received its name from the fact that it enters the Yukon 40 miles below old Fort Reliance. The first steamboat that came up to Forty Mile post arrived there July 27, 1887, at which time 85 men were at the mouth of Forty Mile Creek, subsisting almost entirely on fish, which they caught with nets. The mines produced between $200,000 and $300,000 the first season, and in the winter of 1887 there were about 115 men in the district. Forty Mile district has been very productive, nearly every creek that has been prospected thoroughly yielding gold in paying quantities.

Franklin Gulch has produced a great deal of gold and is still yielding good returns. In 1888 about 100 men, working on the bars, took out from $2,000 to $3,000 apiece.

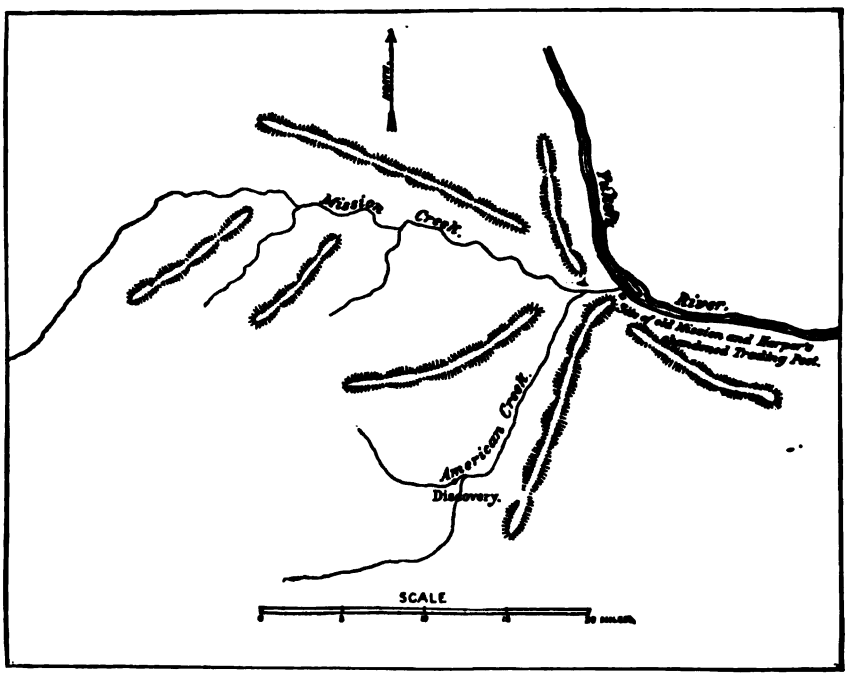
In 1893 Miller Creek, which has been the best producer in the district, yielded about $300,000, a space of ground 30 by 100 feet having produced $35,000. It has continued to yield large returns, John Miller having taken $55,000 from his claim during the season of 1896. This creek is a tributary of Sixty Mile Creek, but is in the Forty Mile district. During the seasons of 1896 and 1897 quite a number of men took out from $3,000 to $8,000 apiece on Miller Creek.

Glacier Creek, so named from the glacial formation, is a comparatively rich creek, but great difficulty has been encountered in working the claims on account of the ice. The creek bed is practically a glacier, the water in many places running through solid blue ice.

Walkers Fork and Napoleon and Davis creeks, all tributaries of Forty Mile Creek, have many good claims.

Chicken Creek, which was discovered two years ago, and which is in American territory, is the best creek in the district. It enters Forty Mile Creek about 150 miles above its mouth. The ground is rich, but irregular, and consists of both winter and summer diggings. The claims on Chicken Creek are 1,320 feet long, but on all other creeks in the district claims are 500 feet long, local mining regulations prevailing. Fifteen men are working on the creek this winter (1897–98).

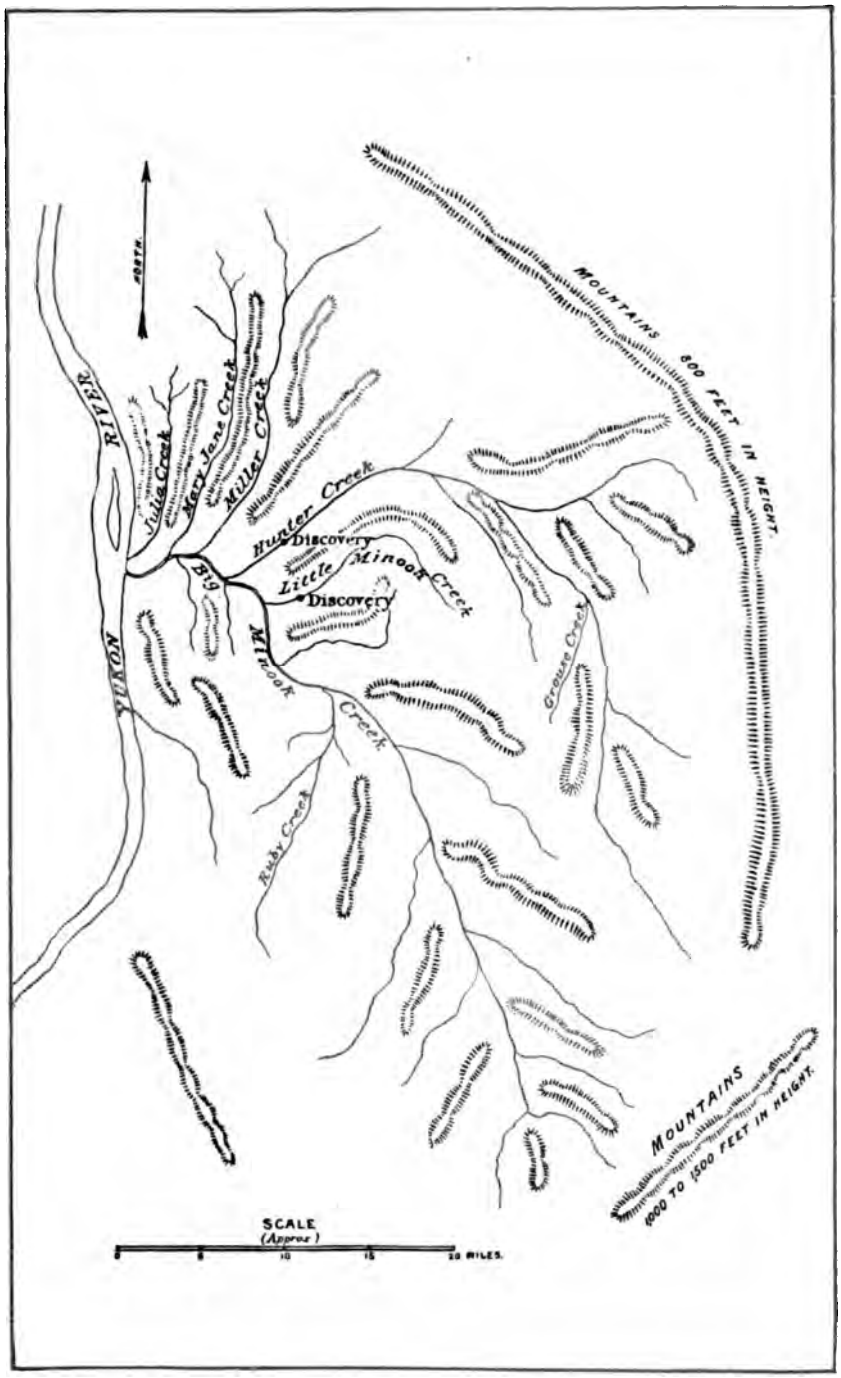
At the time of the strike in the Klondike there were between 600 and 700 men in the Forty Mile district, most of whom had deserted the creeks and gone to the new gold fields by spring, there being now only 30 or 40 men working in the district. There are many creeks that can be worked profitably with wages at $10 a day. Those claims which are being worked at present are operated on the basis of $1.50 per hour, as men can not be secured for less wages. The cost of living in the mines is practically the same as in the Klondike district, the charge for summer freighting



American Creek district, Alaska.

to the mines ranging from 40 to 50 cents a pound, according to distance, and from 8 to 10 cents for winter packing. The trail, like all trails in this country, is indescribably bad.

As is the case throughout the mineral zone, which extends for 1,000 miles through the Yukon Basin, there are many creeks in this district which can not be worked profitably under present conditions, but which will furnish employment to thousands of men for a long period of years when improved transportation facilities enable them to procure supplies at reasonable prices. This is especially true of the North Fork of Forty Mile Creek and its tributaries, all in American territory, where there are large areas of placer ground that will yield from $7 to $10 a day to the man, and which under the application of hydraulic processes will eventually produce many millions. There is also a great deal of quartz of a very promising character on the North Fork. A conservative estimate of the output of Forty Mile district to date places it at $3,000,000.



Minook Creek district, Alaska.

AMERICAN CREEK, SEVENTY MILE CREEK, AND MINOOK CREEK DISTRICTS.

In 1895 gold was discovered on American Creek, a tributary of Mission Creek, which enters the Yukon from the west 45 miles below Forty Mile. American Creek, which is about 20 miles long, flows into Mission Creek from the south at a point 2 miles above the Yukon, and is in American territory. The original discovery was made about 6 miles above the mouth and the creek was located to the forks, 6 miles above Discovery.* It was found impracticable to work the main creek on account of the difficulty of controlling the water, several washouts occurring during the early summer. It was therefore abandoned, and both forks were located for a distance of 4 miles above their confluence. The claims on American Creek are 1,320 feet long, and during the past season seven of these were worked, almost exclusively by the owners, only 2 or 3 men being employed for wages, which were $15 per day. The yield was about $20 a day to the man, and the creek produced between $15,000 and $20,000. On the main creek, from the mouth to the canyon, a distance of 4 miles, the ground is about 6 feet deep, but above the canyon it is shallower, running from 2 to 4 feet. The main creek for its entire length gives promise of proving very productive under hydraulic processes. On the benches there are gravel banks 200 feet in depth, which show colors wherever prospected. There is an abundant supply of water and good grade and dump. American Creek gold is worth $18.85 per ounce.

Seventy Mile Creek, which is about 150 miles long, flows into the Yukon from the west, 70 miles below Forty Mile, from which fact it takes its name. Gold was discovered on this creek in 1887, at a point about 35 miles from the mouth. During the summer of 1888 several men took from the bars, with rockers, $50 a day apiece. Fifteen men were employed there last summer, and they report good results, probably averaging $2,500 apiece for the short season. It is very difficult to get supplies into the Seventy Mile diggings during the summer, owing to numerous falls and rapids in the creek, which make it almost impossible to ascend it in boats and necessitate the packing of provisions over a bad trail. The miners, therefore, sled their supplies up during the winter. The claims are 1,320 feet in length, and the creek is located for a distance of 5 or 6 miles. There are also a few locations 90 miles from the mouth. The creek and its tributaries have merely been prospected in the most superficial manner, but enough is known of the locality to justify the prediction that it will eventually prove, under hydraulic methods, one of the most productive districts on the Yukon. There is a great deal of quartz on the head waters, in the zone which extends across the divide from the North Fork of Forty Mile.

Minook Creek, which flows into the Yukon from the south 50 miles above the Tanana, was discovered in 1894. The best ground in the district, so far as known, is located on Hunter Creek, which comes into Minook from the east about 5 miles above its mouth. Hunter Creek is located for about 15 miles. Little Minook Creek, flowing into Minook Creek a mile above Hunter Creek, is located for 3 miles. The claims are 500 feet long on all creeks except Little Minook, where they are 1,000 feet. Very good reports have been received from the Minook district, but no authentic information is at hand as to the value of the prospects. Some sales of claims at prices as high as $5,000 apiece have been reported. A large number of people stopped off at Minook during the past summer on learning of the shortage of provisions at upriver points, and many returned to that place from Fort Yukon. There are about 500 men spending the winter there, and it is probable that by spring it will be known definitely whether the district is as rich as the rumors indicate it to be.

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Birch Creek is about 350 miles long. The North Fork has its source in the Ratzel Mountains, 100 miles west of Circle City, flowing to the southward some 50 miles,

* This does not agree with the accompanying map, but the author who furnished both map and text being still in Alaska it is impossible to reconcile the differences. The map, however, is believed to be correct.

and then eastward 80 or 90 miles, completing at Birch Creek proper an almost perfect semicircle at a point 8 miles west of Circle City, and thence flowing parallel with the Yukon for 150 miles, emptying into the latter stream 30 miles below Fort Yukon. The South Fork, flowing in a northeasterly direction, unites with the North Fork 60 miles southwest of Circle City.

The first discovery of gold by white men in the Birch Creek district was made on August 10, 1893, at a point on Birch Creek a few miles west of the mouth of South Fork, now known as Pitkas Bar. The discovery was made by Henry Lewis, John McLeod, and Gus Williams, who had come down from Forty Mile during the preceding month with a view of prospecting in this locality, having learned that an Indian named Pitka had taken out some gold at the point above named during the summer of 1892. Twenty-five or thirty men from Forty Mile followed Lewis and his companions during the fall of 1893. During the spring of 1894 $10 a day to the man was made on Pitkas Bar. On June 15 of the same year a discovery was made on Mastodon Creek by Pat. J. Kinnaley and John Gregor, and on the 22d of that month good ground was found on Independence Creek by some of the men who had come down from Forty Mile the previous fall. The discoveries on Mastodon and Independence were creek diggings, and the claims there have proved very productive.

Mastodon is the best creek in the district, having yielded more than one-half of the total product of the Birch Creek mines, and will soon become known to the world as one of the richest placer gulches ever discovered. There are 59 claims on the creek, but many of them are lying idle on account of the difficulty in getting miners. The output last summer was $260,000, 18 claims being worked, with 260 men employed. The period of active mining operations was about 60 days. The claims could have been worked longer, but as soon as the miners accumulated a "grub stake" they left for the Klondike and elsewhere to prospect. There is an abundance of water on the creek, it never getting below a sluice head. Mastodon has been known locally for two or three years to be the best creek in Alaska, but until the past fall it had not been thoroughly enough prospected to warrant a positive statement as to its richness and extent. Eight holes have recently been sunk to bed rock on Discovery and No. 1 above, which show an average of 10 feet of gravel that will run 25 cents to the pan, as high as 2 ounces having been taken out of a single pan. The pay streak is 1,100 feet wide, so far as known, and may be much wider. These two claims will run from $1,700 to $4,000 to the box length. Active developments on the claims above and below Discovery indicate that for 2 miles the pay streak runs from 800 to 1,000 feet wide and that the ground for this entire distance will average $1,700 to the box length. The prediction is here made, based on authentic information, that the 10 miles of ground on Mastodon and Mammoth (which are one creek except in designation) already prospected will eventually produce as much gold as any successive 10 miles on Bonanza, while the 10 claims on Mastodon, from 4 below to 5 above Discovery, inclusive, will without doubt prove as productive as any 10 claims on Eldorado, taken in their numerical order. Furthermore, on account of the even distribution of the gold in the Birch Creek district, the output here, extending over a longer period of time and employing larger numbers of men, will be of incalculably greater economic benefit to the community than the more phenomenal production of the creeks in the Klondike district.

Independence Creek has 29 claims, which yield about an ounce per day to the man. The creek was not worked extensively during the past season, as miners could not be secured, only two or three claims being operated, with 7 men employed, and producing about $7,000.

Mammoth Creek, which is formed by the junction of Mastodon and Independence, and empties into Crooked Creek, is about 5 miles long. This creek, which was discovered in 1894, has been opened in three different places, and paid $8 to the man, shoveling in. It was abandoned and relocated for hydraulic operations. Capt. John J. Healey owns 2 claims on the creek, Henry Lewis 4, and Kinnaley & Gregor 7, all

of 20 acres each. There is an ample supply of water, with good grade and dump, and when hydraulic machinery can be procured, the creek will be a great producer.

Deadwood Gulch, located in 1894, has 47 claims, 8 of which were worked during the past summer, employing 110 men and yielding about $100,000. The pay streak is about 30 feet wide, and, although somewhat spotted, the ground is very rich.

Miller Creek has 64 claims, 9 of which were worked last summer, producing $30,000. Forty men were employed for about 60 days to secure this output.

Eagle Creek, discovered in 1895, has 46 claims, only 4 of which were worked during the past summer on account of the scarcity of miners, producing $75,000, with 75 men employed. All of the claims on this creek can be worked profitably at the prevailing rate of wages. Owing to the difficulty of reaching Eagle Creek with supplies, $12 a day is paid for labor there, $10 being the rate of wages on all of the other creeks in the district.

Gold Dust Creek has 60 claims, all of which were abandoned during the Klondike stampede. These were all subject to relocation during the past fall, and have been restaked.

Harrison Creek is 30 miles long, and contains about 100 locations, the claims being 1,320 feet long. It has been relocated, and would have been worked during the past season if it had not been for the stampede. There is probably not a claim on the creek that would not yield $8 to the shovel under present conditions, and as there is an ample supply of water and good grade it will eventually produce many millions under hydraulic processes.

Porcupine Creek is about the same length as Harrison, and in 1896 had quite a number of claims 1,320 feet in length, having been located for hydraulic purposes. It was abandoned, and is subject to relocation.

Lower Coal Creek, on which a discovery was made in 1895, enters the Yukon from the west, 50 miles above Circle City, and is about 30 miles long. There were 15 or 20 1,320-foot claims on the creek in 1896, but they were abandoned, and are now subject to relocation. There is a fine vein of bituminous coal on this creek, 3 miles from the Yukon. The coal burns well, producing a fine ash entirely free from clinkers, being far superior to the Puget Sound coal brought into the country by the transportation companies.

The claims on Mammoth, Harrison, Porcupine, and Lower Coal creeks are 1,320 feet in length, having been located under the United States law for hydraulic purposes, but all the other creeks in the district have claims of 500 feet, the limit prescribed by the local mining regulations. As the United States law now prevails in the district, it is probable that henceforth locations on newly discovered creeks will be for the full 20 acres allowed under the law.

There are a large number of creeks in the Birch Creek district which run from $6 to $10 per day to the man, and which, of course, can not be worked at the prevailing wages and under present processes, but which can be profitably operated by means of hydraulic appliances.

The gold produced by the Birch Creek mines is very coarse, many nuggets running from a quarter of an ounce to 4 or 5 ounces having been secured. The quality of the gold is better than that of any other district on the Yukon, with the possible exception of Minook, running from $16 to $19 per ounce, Eagle Creek gold assaying up to the last-named figure. The average for the district is about $17.20 per ounce, while the average for the Klondike falls below $16, Eldorado gold, which contains much silver and base material, running but $15.25.

The ground in most of the gulches is quite shallow and easily worked; but on Mastodon, Independence, and one or two other creeks there are also good winter diggings, and drifting is carried on there actively during the cold weather.

Preacher Creek, which enters Birch Creek about 60 miles from Circle City, is 150 miles in length and has been prospected but little. Mr. Wilson, in his Guide to the Yukon Gold Fields, makes the following interesting statement relative to this creek:

"The creek was named after a preacher who made an exploration trip of some length

in search of fossils. It is reported that he found high clay banks some 70 miles from its mouth. These banks were about 300 feet high and overlaid a layer of driftwood some 200 feet down. Much of this driftwood was well preserved and of much larger dimensions than any growth in the country at present, some of the trees being fully 4 feet in diameter. The creek is constantly undermining its banks, thus bringing down great slides of clay and wood which completely fill the creek at times. This goes to prove beyond a doubt that the great Yukon Flats were at one time a vast lake, much larger than any fresh-water lake existing to-day."

The mines are from 45 to 80 miles from Circle City, and the trail which crosses Birch Creek about 8 miles from town, thence following that stream and Crooked Creek to the mines, is almost impassable in the summer time. The description of the Bonanza trail, given in the section on the Klondike, applies equally well to the Birch Creek trail, with the addition of the reluctant admission that the Birch Creek mosquitoes are somewhat larger and incalculably more numerous than the Klondike variety, a fact ascertained by taking the consensus of opinion of a number of unfortunates who have been tortured by both. The rate for summer packing to Mastodon (65 miles) is 40 cents per pound, the winter rate being 15 cents. Dog teams make the round trip in five days, the sleds being loaded with 200 pounds to the dog. The winter trail is generally open by the 15th of October, and sledding lasts until about the 10th of May. Previous to the Klondike stampede, 30 or 35 horses were used for packing to the mines, but they were withdrawn for freighting between here and Dawson and have not since been in use on the Birch Creek trail.

At the time of the Klondike strike there was a population of about 1,000 in Circle City and the Birch Creek district, and the town was in an exceedingly prosperous condition. The mines had produced nearly $1,500,000 during the season of 1896 and as a consequence money was plentiful and all lines of business were doing well.

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Early in December a prominent mine owner of the Birch Creek district, who was visiting Circle City, was requested to secure for use in this chapter a copy of the local mining laws of the Mastodon district, and he promised to do so. During holiday week the following letter was received from him:

"I sent to the recorder of Mastodon, as you requested, for a copy of its laws, and inclose herewith his reply, thinking it may amuse you, and believing you have too much sense to be offended. The writer is an honest, sensible, hard-working man, and highly esteemed by all who know him, and his note is simply an index of the feeling of distrust with which old-timers, or at least the greater part of them, view Government officials, and the innovations which are taking place in both the mining and civil laws. The few Government officials that Uncle Sam has sent us heretofore have, it is believed, done little good for the country or the Government, while it is strongly suspected that they have abused the powers of their office by levying blackmail on the commercial companies, saloon keepers, and others. I do not allude to the present officials; they have yet to prove themselves.

"It is a pretty general sentiment that the Oregon code of civil laws and the United States mining law are inadequate to our needs, as our isolated position, short seasons, and severe climate differ from those of any other portion of the United States. Our old system of government, by means of miners' meetings, was on the whole very efficient, and crime was almost unknown. Whether the present system is, or is likely to be, a success, you have an opportunity to judge for yourself.

"I inclose herewith a copy of the Miller Creek mining laws."

The following are the laws of Miller Creek:

"The recording fee for each location and transfer of claims shall be $2.50.

"Three hundred dollars' worth of work must be done on each claim and in each year. If said amount of work has not been done by the 1st of July in each year it must be done during that month or declared vacant. Three inspectors shall be elected to determine whether the required amount of work has been done on each claim, and their decision shall be final.

"A fraction of a claim shall do assessment work in proportion to its length.

"No claim shall for any cause be laid over for a season.

"No claim owner shall ground sluice stumps or sod onto the claim below him.

"Each claim holder is entitled to dump tailings for a space of three box lengths on the claim below him."

The unwritten laws and customs of the Birch Creek district, as near as can be ascertained, are as follows:

"A claim consists of 500 feet lengthwise of a gulch and from rim to rim in width.

"Each discoverer of a new gulch shall be entitled to an additional 500 feet.

"Claims shall be numbered above and below discovery.

"A claim owner is entitled to all of the timber on his claim, but all timber above the rim on the side hill is free for all.

"A man is entitled to locate one claim for himself, and for no one else, on each gulch, and having used his right once on a gulch can not do so again.

"Previously to recording, provided no vested interests are jeopardized, a locator may cut his name off his stakes and relocate on the same gulch.

"An alien is entitled to the same privileges as a citizen in locating and working mining ground.

"Nothing in the local mining laws shall be construed to prevent a locator from buying claims."

The custom relative to the rights of aliens originated in the Forty-Mile district, where, until recently, there was a local dispute as to the location of the boundary line, the Canadians and Americans agreeing, for mutual protection, to the provision as given above.

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ALASKA, ITS MINERAL AND AGRICULTURAL RESOURCES, CLIMATIC CONDITIONS, ETC.

One of the best books written on Alaska, and the one which contains the most accurate information relative to the Yukon region, is Victor Wilson's Guide to the Yukon Gold Fields. This gifted author spent the summer of 1894 on the Yukon, and the results of his observations were published in January, 1895, almost simultaneously with his death, the direct outcome of the exposure and hardships of his journey through Alaska. While the book, on account of its hurried preparation, shows some defects, it contains a vast amount of information of remarkable accuracy, presented in a most charming style. Mr. Wilson's work has been used freely in the preparation of this report, not in the appropriation in any reprehensible degree of the material contained therein but rather as a guide and inspiration in wandering through an almost pathless wilderness of isolated and elusive facts. The liberty is taken of making the following quotation from the introduction to the book:

"The rush to the Yukon last spring saw many prospectors in the field with the most promising results. Many new creeks were discovered of great extent and richness, and all the old mines yielded better results than ever before. No creek in the entire basin, which was prospected with any degree of precision, failed to show at least a color. The estimated amount of gold taken out of the country last year has been placed as high as $1,000,000, and while this is highly improbable, the many who have returned with amounts varying from $5,000 to $35,000 prove beyond a doubt that the country is one of great richness. With these facts fresh before the public, at a time when the brawn and muscle of our great nation is almost at a standstill, it may reasonably be expected that many will turn their attention in this direction, and it is therefore the purpose of these pages to give such information as will be of benefit to those who undertake the trip.

"The Chilkoot Pass is the only route used to any extent at present by the miners, and is the shortest portage from salt water to the navigable waters of the Yukon. This route leads over the Chilkoot Pass down the lake to Lewes River, thence down the Yukon to the mines at different points on that river. The trip is one of difficulties, which will tax the endurance and nerve of the most hardy, and only such men can reasonably expect to succeed, for only with the most incessant toil, such as pack-

ing provisions over pathless mountains, towing a heavy boat against a 5 to an 8 mile current over battered bowlders, digging in the bottomless frost, sleeping where night overtakes, fighting gnats and mosquitoes by the million, shooting seething rapids and canyons, and enduring for seven long months a relentless cold which never rises above zero and frequently falls to 80 degrees below—any man physically endowed to overcome these obstacles who will go there for a few years can by strict attention to business make a good stake, with the possibilities of a fortune.

"The climate is one unequaled for health, the summer months are delightful, game is plenty in season, and the winters, while cold, are healthy and help to recuperate the lost vitality from the incessant toil of the summer.

"The next few years will see wagon roads and trails through the Coast Range, steamers on the lakes and upper river, and the whole of the vast upper country will be made accessible to the miner. Then hundreds will flock there, and ten years will see a population of 100,000 people in the Yukon Basin. Then its vast richness will become the byword of the world, for it is a poor man's country; nature has stored her treasure in a safe of ice with a time lock which opens only in the long sunny days of summer. Hydraulic mining is made impossible owing to the lack of water, for only the glacial drip of the hills is accessible to the gulches, which carry the most gold. This will make its period of productiveness much greater, while capital will find lucrative investments in the rich lodes of gold, iron, coal, and copper, and in the bars of the rivers, which have become no longer useful to the pan or cradle in the hands of the miner. All along the whole route from the Coast Range down to old Fort Yukon the close observer can see vast treasures in the mountains—coal, marble, and copper—only waiting for the country to devolop to such an extent as to bring them within reach of the outside world.

"The country south of the Pelly River is quite well timbered. It is a good grazing country; all the hardy vegetables grow well, and even wheat ripens.

"It is a fine game and fish country. Bear of several varieties, moose, caribou, wolves, and many fur-bearing animals abound. It is doubtless the greatest country in the world for the silver and the black fox. The rivers and lakes are teeming with many varieties of fish, while grouse and rabbits are numerous along the shore. Waterfowl of many kinds are plenty, and their long sojourning in these inland waters gives to their flesh a flavor which, although high and gamy, never acquires that repulsive, fishy taste so universal to the fowls of this coast.

"When once this country is made accessible from the sound points by proper transportation facilities it can be reached in ten days. Then it will become one of the greatest tourist countries of the world, for where is grander scenery, a more beautiful climate, or a more favored spot than in this lake country during three months in summer? The shores are bordered by strips of green meadow, bedecked with wild roses and an endless variety of flowers of the most delicate tints, while terraced open and timbered slopes stretch away to high mountains, which in turn are backed by snow-capped peaks. During the whole summer scarcely any rain falls, with the exception of an occasional thundershower; the sun is seldom lost sight of, except for a brief period at night.

"Within three years it will be possible to leave Seattle in the spring, work in the mines all summer, and return in the fall. Then the importance of these vast gold fields will come to be realized, and in the near future the word Yukon will associate itself so closely with that of gold, that its mere mention will convey impressions of an Eldorado rivaling that of fable."

The foregoing, read in the light of recent events, shows that the writer was endowed with the spirit of prophecy. The following extract from the introduction to Miner W. Bruce's work on Alaska, published in 1895, indicates that he, too, held substantially the same views in regard to the future of that Territory:

"The field is large, and already the dawning of great enterprises fills the minds of ambitious projectors. Gold fields are to be opened up, railways built, possibly *with a span of communication with* the Old World, besides many other projects *which will cause the active* American brain to vibrate with new vigor; and if the

writer can awaken any patriotic sentiment to further and protect the interests of this grand Territory he will be satisfied.

"He can not consistently advise those seeking a place to make a home or those looking for a new field of labor to choose Alaska, unless they have some means and a reasonable amount of stamina and good health. To anyone possessed of these qualifications he unhesitatingly and unqualifiedly says 'Go.'

"He is in earnest when he says that he believes the next few years will present many opportunities for investment and for laying a foundation for lucrative business enterprises, and perhaps wealth; but if anyone expects to acquire these without experiencing the hardships and privations incident to pioneer life he will be disappointed."

Until the past season, on account of the lack of transportation facilities and the consequent impossibility of bringing mining machinery into the country, but little attention had been given by the miners of the Yukon Basin to the subject of the possible discovery and development of quartz ledges. Now that the introduction of machinery within the next two or three years is within the bounds of probability an active interest is being taken in the search for quartz. It is known to a certainty that many gold-bearing leads that can be worked profitably under favorable conditions exist at the head of the North Fork of Forty Mile Creek, and that they have been traced across the head of Seventy Mile. The great copper belt which crosses the Yukon at Dawson extends through Alaska to the Copper River country. This belt crosses the Tanana Valley from 100 to 150 miles from Circle City, and the Indians and a few white men who have been in that country report that native copper is found in large quantities, often in masses weighing from 20 to 100 pounds, in the beds of the streams, indicating beyond doubt that the region is exceedingly rich in copper. The proposed railroad from the head of Cook Inlet or Prince William Sound, referred to in the section on transportation, would strike the Tanana in the heart of this great copper zone, a fact which effectually disposes of the principal objection to the construction of a railroad into a placer-mining country by the assurance of an immense tonnage of return freight to tide water.

During the present winter (1897-98) many prospectors have gone from Circle City to the head waters of the Tanana River, where, it is rumored, good creeks have been found, and quite a number have gone up the Porcupine from Fort Yukon; so it is quite likely that by the middle of the coming summer it will be definitely known whether there is any truth in the marvelous stories told by the Indians relative to the richness of those streams. Without regard to new discoveries, however, as stated elsewhere, there are thousands of acres of placer ground in the various districts that will yield fine returns under the application of hydraulic processes, while there are large veins of bituminous coal in many localities that offer attractive inducements to capital.

The Territory of Alaska must necessarily be divided agriculturally into three districts, each differing from the other in climate, vegetation, and physical characteristics.

The Yukon district is bonded on the north and west by the Arctic Ocean and Bering Sea, on the south by the Alaskan Range, and on the east by the boundary line.

The Aleutian district embraces part of the Alaska peninsula and all the islands west of the one hundred and fifty-fifth degree of longitude.

The Sitkan district includes all our Alaskan possessions south and east of the peninsula.

The Yukon district is the only one immediately considered in this report, as the interest now centers in that section. The character of the Yukon territory varies from low, rolling hills, fairly easy of ascent and covered from foot to crown with a luxuriant growth of vegetation, to broad, marshy plains extending for miles on either side of the river, especially near its mouth. The rocks vary much, the greater proportion being conglomerate, syenite, quartzite, and sandstone. Trachyte and lava abound in many parts of the valley. The superincumbent soil also differs in some localities, being sometimes sandy and sometimes clayey. In the latter case it

is frequently covered with a growth of sphagnum, which causes a deterioration of the soil below it. Over a large extent of country it is a rich alluvium, composed of very fine sand and vegetable matter brought down by the river and forming deposits of indefinite depths, and in such localities fresh-water marl is invariably found in abundance. The soil in summer is usually frozen at a depth of 3 or 4 feet in ordinary situations; in colder ones it remains icy to within 12 or 18 inches of the surface. The layer of frozen soil is usually 6 or 8 feet thick, and below that depth the soil is oftentimes destitute of ice. This phenomenon is undoubtedly traceable to the scant drainage, combined with the nonconductive covering of moss, which prevents the scorching sun of an almost tropical midsummer from thawing out the soil. In places where the soil is well drained and is not covered with moss, as in the large alluvial deposits near the mouth of the Yukon River, the frozen layer is much farther below the surface, and in many places appears to be entirely absent. There is no doubt that in favorable situations, by drainage and deep plowing, the ice can be entirely removed from the ground, and, as will be noticed later on, it is safe to say that this subterranean ice layer is essentially due to the mossy accumulations that are so prevalent in the Yukon territory. It is quite possible to conceive of a locality so depressed and deprived of drainage that the annual moisture derived from the rainfall and melting snow would collect between the impervious clayey soil and sphagnous covering, congeal during the winter, and be prevented from melting during the ensuing summer by the nonconductive properties of the mossy covering. The lesson that the agriculturist or political economist may learn from this peculiar formation is that a luxuriant growth of vegetation may exist in the immediate vicinity of permanent ice, bearing its blossoms and maturing its seeds as readily and profusely as in situations much more favorable. Hence it is safe to infer that a large extent of territory, embracing millions of acres long considered valueless, may yet furnish to the settler, if not an abundant harvest, at least an acceptable and not inconsiderable addition to his fare of fish, game, and canned goods.

The climate of this Territory in the interior differs from that of the seacoast, even in localities comparatively adjacent, that of the coast being tempered by the vast body of water in Bering Sea and many southern currents bringing warmer water from the Pacific and making the coast much milder than the country even 30 miles inland. The summers, on account of the heavy rainfall and cloudy weather, are much cooler and less pleasant on the coast than in the interior. The months of May, June, and July are sunny, fairly warm, and clear as a rule, and the development of plant life is extremely rapid. The snow has hardly disappeared before a mass of herbage has sprung up, and the patches which but a few days before presented the appearance of nothing but a white sheet are now teeming with an active vegetation, producing leaves, flowers, and fruit in rapid succession. The long arctic day seems to have little deleterious effect on plants, as they have their period of sleep, even as in the Tropics, which is indicated by the same drooping of the leaves and other signs observed in milder climates.

Many people have a wrong impression as to the duration of day and night here. While it is true that in the months of June and July and part of August the sun is visible for possibly twenty hours out of the twenty-four, and there is no darkness akin to night during the remaining four hours of the day, the spring and autumn are very similar to those seasons in a lower latitude, save in the rapidity with which the hours of sunlight increase or decrease. In the summer months it is only at night that the traveler or prospector is able to accomplish anything, as there is sunlight enough at midnight to read or work by, and the cool breezes that blow only at that hour bring relief from the stings of the myriad insects that have made the tropic-like day so unbearable.

The winter months are not so dark and gloomy as they are generally supposed to be. While the sun is visible for only a few minutes on December 21, the amount of actual sunlight is four and a half hours, and even after the entire dissipation of sunlight the light reflected by the snow and that borrowed from the aurora enable the

traveler to pursue his way, while the moonlight in this region seems to attain a higher brilliancy than in lower latitudes, it being possible to read by its aid, and photographs of even distant objects have been very successfully taken by an exposure of fifteen minutes.

The following table shows the mean temperature of the seasons as observed in 1894:

MEAN TEMPERATURE OF EACH SEASON, 1894.

Season.	Locality.		
	St. Michaels.	Nulato.	Fort Yukon.
Spring	29	20	14
Summer	53	59	60
Autumn	26	36	17
Winter	9	—14	—24

The present winter (1897-98) has been one of phenomenal mildness. Observations of temperature at Circle City during the months of October, November, and December, 1897, show the following results:

	8 a.m.	8 p.m.
October:		
High	30	30
Low	—18	— 6
Mean	8	
November:		
High	20	20
Low	—40	—39
Mean	— 7	
December:		
High	26	6
Low	—34	—30
Mean	— 6	

The mean annual temperature of the Yukon Valley, from the mouth of the river to the boundary line, may be roughly estimated at 23 degrees. The greatest degree of cold ever recorded in this district was 77 degrees below zero, but such cold as this is exceedingly rare, and has but little effect on the vegetation of the country, covered as it is with from 3 to 5 feet of snow.

Open water is found in many of the tributaries of the Yukon even in the coldest weather, and many springs are never frozen. This phenomenon is particularly noticeable between Circle City and Fort Yukon. Oftentimes when traveling over a well-beaten trail in the coldest weather, when one's breath is frozen as rapidly as exhaled, a yellow smudge indicates that possible danger is lurking in the middle of the trail; but while you hesitate the smudge disappears and a volume of yellow water boils over the surface of the ice, and you break a new trail around the treacherous spot. This peculiar uprising of the water is undoubtedly due to the existence of hot sulphur springs in the bed of the river. The water at these points has a decidedly sulphurous taste.

The real opportunity for agricultural enterprise in any country can not be deduced from annual mean temperature alone, but it is in a measure dependent on the heat and duration of the summer. It is a common occurrence for the thermometer placed in the direct rays of the sun to rise gradually to 120 degrees and burst the spirit thermometers in use here, which intensity of heat can only be appreciated by one who has endured it. The only relief obtainable from the torridness of the summer months on the Upper Yukon, during which vegetation attains an almost tropical luxuriance, is found in the brief time when the sun sinks almost to the horizon in the north; the transient coolness of the midnight air then becomes a blessing to the weary voyager.

The annual rainfall for the Yukon Valley is estimated by careful observers at about

25 inches, while on the coast it is from 60 to 70 inches. The snow fall will probably average 6 feet in the Yukon district, although oftentimes it is as much as 10 or 12 feet.

In the interior there is much less wind than on the coast, and the snow lies as it falls among the trees. Toward spring the gullies and ravines are well filled, the underbrush covered, and travel with dogs becomes easy and pleasant, for the snow, melted on its surface by the noonday sun, has been frozen to a crust, rendering snowshoes entirely unnecessary.

In the valley of the Lower Yukon the months of May and June and part of July bring sunny, delightful weather, but the remainder of the season is usually rainy—three or four days in the week, at least. In the latter part of the summer it is somewhat foggy, but as one ascends the river the climate improves, and the short summer is dry, hot, and pleasant, only varied by an occasional quick shower.

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A large number of the tributaries of the Yukon are navigable for a distance of from 50 to 400 miles. The Tanana can be ascended at ordinary stages of water to the last-named distance by boats drawing 4 feet. For boats drawing 3 feet the Andreafski is navigable for 100 miles, the Koyukuk for 300 miles, and the Porcupine for 155 miles. The Stewart River can be navigated 220 miles by boats drawing 30 inches, and boats of like character can ascend the Pelly 250 miles in high water. White River is navigable for boats drawing 3 feet to a distance of 150 miles in high water. Lewes River can be navigated by boats drawing 30 inches from its mouth to Rink Rapids, a distance of 53 miles. In the opinion of experienced river men it is not possible to take a boat through Rink and Five Finger rapids, which are about 6 miles apart, although, as stated in the section on The Trails, it is authentically reported that Canadian capitalists are building boats to run from the head of Lake Teslin down the Teslin (Hootalinqua) and the Lewes to Dawson. If this be so, it will be necessary to line the boats through both rapids. The distance from the mouth of the Teslin to the head of Lake Teslin is 332 miles, and a surveyor of the Dominion Government, who came down the river in October, reports that he found from 1 to 28 fathoms of water in the lake, which is 105 miles long, and not less than 5½ feet in the river, which was at low stage at the time of the soundings. From Five Fingers to the White Horse Rapids, a distance of 217 miles, boats of 3-foot draft would have no difficulty at a medium stage of water, while boats of 4-foot draft could successfully navigate the upper river from Grand Canyon through the lakes to the head of Lake Bennett, a distance of 99 miles. It is possible that some dredging would be necessary to enable boats to get over the shallow bars at the foot of two or three of the lakes.

Thus it will be seen that the Yukon and its tributaries constitute a vast system of waterways of about 4,000 miles in aggregate length and navigable for boats of from 200 to 800 tons, and it should be borne in mind that there are numerous streams which have not been explored that may eventually bring the figure to 5,000 miles or more. This magnificent network of navigable rivers must in the nature of things be the most important factor in the future development of the greatest mineral zone on the American continent.

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REPORT OF THE CHAMBER OF COMMERCE OF JUNEAU, ALASKA.

The within sketch of the resources of Juneau has been compiled by the Chamber of Commerce of Alaska, and is respectfully sent to, and by the request of, the Department of Labor, Washington, D. C.

The chamber of commerce takes extreme pleasure in ever holding itself at the commands of the Department, and will willingly furnish any and all data and information respecting this coast of Alaska that it may have in its possession.

Respectfully submitted.

L. G. KAUFMAN,
Secretary Alaska Chamber of Commerce.

In the autumn of 1880 the site of this present thriving city was a wilderness, covered with a forest of standing timber and a dense, tangled undergrowth of alder, salmon-berry bushes, and thorny "devil club," a mass almost impenetrable even to the beasts which were its only inhabitants. It was then that Richard T. Harris and Joseph Juneau, prospecting along the shores of Gastineau Channel, discovered Gold Creek and, following up its rocky canyon, found rich placer and quartz. The news of the discovery brought others to the scene, and the first house was brought, ready framed, from Sitka, and put up December 4, 1881, by George E. Pilz, since deceased. The building of the town immediately followed the discovery of gold. The first name given to the place was Harrisburg, but shortly after it was changed to Rockwell, after one of the naval officers then stationed at Sitka. In the fall of 1881 the citizens, thinking that one of the discoverers in the camp, Joseph Juneau, had not received the full measure of honor due him, held a meeting and again changed the name of the town, from Rockwell to Juneau.

By the beginning of 1882 the population of Juneau had increased to about thirty persons, principally miners from Wrangell and Sitka. Some of those from Sitka were thirty days, or even more, making the voyage, owing to the rough weather which frequently prevails in that latitude during the winter months. One party lost its course, and, having no chart, went nearly around Admiralty Island, exploring almost every bay and inlet between Sitka and Juneau. Another party was blown ashore on an island in Stephens Passage, the canoe wrecked, and most of the effects washed away by the surf, and over a month was consumed in completing the trip. Other similar disasters were of frequent occurrence. One coming to Alaska now on the floating palaces which ply regularly between her ports and the centers of trade can scarcely realize the hardships, privations, and sufferings endured by the pioneers of the district.

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Juneau is the only city in Alaska which has been granted a United States patent for its town site. The town-site entry was made October 13, 1893, under the act of March 3, 1891. John Olds was the first trustee appointed, who was succeeded by Karl Koehler, and was in turn succeeded by the present incumbent, Thomas R. Lyon. A patent for the town site was issued September 4, 1897, and about the middle of October the first deeds for town lots in Juneau were issued. The patentable acreage in the town site of Juneau was 108.49.

By reason of her favorable situation with respect to the immense adjacent quartz mines and as the supply and transfer point for the interior, Juneau has, in the short period since the first discovery of gold in Silver Bow Basin, gained a supremacy in population and a commercial importance far in excess of any other city north of Puget Sound. Juneau is the key city of the far northwest—a busy, businesslike, cosmopolitan town of about 3,000 permanent residents. The population is largely augmented during the winter season by prospectors and miners who are prevented by the severity of the climate from the pursuit of their summer callings and in summer by tourists who flock hither attracted by the grandeur of its unsurpassed scenery. During the three years just passed Juneau has had a marked and steady growth, until now, instead of the miners' cabins and the makeshift trading stores, there have appeared substantial residences and modern business blocks of which larger and more southern cities might well be proud.

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Juneau, from its geographical situation, and from the number, experience, and capabilities of its merchants, is the logical outfitting and supply point for the mines of the coast and the interior. The prospector, bent on exploring the gold regions of the interior, first comes to Juneau, purchases his outfit and supplies, and then decides as to which route he shall take to the interior. Good-sized boats ply regularly between Juneau and Wrangell, Taku Inlet, Pyramid Harbor, and the head of navigation on Lynn Canal.

Juneau is the center of the Harris mining district. Tributary to Juneau is a vast

mineral belt, upon which are mills containing, approximately, 1,500 stamps and furnishing employment to about 5,000 people. A short sketch of this mining district may be of interest to the Department.

Four miles from Juneau, at the head of Gold Creek, lies Silver Bow Basin, where Juneau and Harris made their first discovery of auriferous quartz. Here the development of properties has been steadily carried forward. All the claims are highly productive and their permanency assured. The first attempt at milling in this basin was made by the Johnson Mill and Mining Company, which built the first wagon road to the falls, where it erected a mill to work the ores from the mines now owned by the Ebner Gold Mining Company. In 1887 George E. Pilz erected a small Huntington mill on the property now being operated by the Alaska-Juneau Gold Mining Company. The veins of the Silver Bow Basin have a general trend from southeast to northwest, with a dip about 3 feet in 10, and are classed as contact-fissure veins, the reef having a black slate hanging wall and a greenish-colored gneiss foot wall. Between the walls of the contact a space of several hundred feet intervenes, which is filled in with schists, quartz veins, and vein matter. The filling is network from knife-blade seams to several feet in thickness, although the general trend of the main vein is in the direction of the strike on the reef. The character of the ore is a sulphurate of iron and galena, associated to a small degree with zinc blende, antimony, and copper pyrites, and carries both gold and silver, although generally richer in gold.

Leaving Silver Bow Basin and crossing a divide at an altitude of 3,500 feet into Sheep Creek Basin, this same vein increases greatly in silver, while the amount of gold carried is about the same. In the easternmost workings of the Silver Queen, at nearly the foot of the range, is found native and ruby silver and gray copper ores similar to the silver districts of Colorado and Nebraska, but, as stated before, it also runs well in gold, and all milling of these ores consists simply in reducing their bulk by concentration and without any free-gold saving appliances. The reef is located continuously from two to three claims in width for a distance of over 6 miles through Silver Bow Basin and over the range into Sheep Creek Basin to the Silver Queen, with almost continuous surface croppings the entire distance. Following still farther east along the belt, where the reef leaves the valley and climbs the mountain side, the veins again crop to the surface, and locations are strung out from this point over another high range and through valleys and over ridges to Taku Inlet, a distance of fully 8 miles. On this end are the Star of Bethlehem, Last Chance, Sheridan, and Little Queen locations, which show some very rich gray copper ores. There is no doubt of the development of this basin into one of the leading quartz camps of Alaska.

Shuck Bay has produced large amounts of placer gold in past years, though now its leads are attracting considerable attention. Of these the Red Wind group is most advanced in development, located in Shuck Basin, and owned by the Windham Bay Gold Mining Company. This property was located several years ago by William Ebner, of Juneau, and others, and considerable development work has been done on the same. The ore is of a free-milling nature, carrying iron and zinc blende, galena, a trace of copper in combination with gold, and a small percentage of silver.

While the first auriferous quartz discovered in Alaska was found near Sitka, mining operations have never been vigorously prosecuted in Sitka district. During the past season considerable interest has been manifested and several very promising groups of claims have been bonded to Eastern capitalists, and the coming season will witness a great deal of development work.

The richness of the surface prospects in Sumdum district, 50 miles south of Juneau, has inspired the gold seeker with great hope for the future of the many located in the vicinity, and the promise has been fulfilled in every instance where development has been made. Most conspicuously is this true in the case of the Bald Eagle mine, which, a mere prospect four years ago, has become one of the richest and best-paying properties on the Pacific coast. The ores carry very little free gold, the values lying

entirely in sulphurates, these being principally pyrites, though both zinc and lead sulphurates are present in considerable quantities, the octagonal sulphurate predominating, this being the richest of all quartz, wherever found. A crusher at the mouth of the adit discharges its product into a flume, which conveys it to the mill, nearly a mile distant, at a nominal cost for handling, and its richness may be estimated by the fact that the 4 stamps in four days less than six months produced concentrates valued at a round $100,000, or nearly $17,000 per month. The average value of all ores mined is $30 per ton.

Admiralty Island, one of the largest of the Alexander Archipelago, lies south of Juneau. It is separated from the mainland coast by a narrow channel, and its mineral belt is in common with that of Douglas Island, lying north of it. A number of claims have been located upon its ledges, which vary in character from low to medium grade, and in size from mere stringers to immense deposits, approaching or even exceeding that of the great Treadwell. Funter Bay, on the west side of the island, is one of the most promising locations.

Upon Douglas Island there are now dropping 480 stamps in the mills of the Treadwell and the Mexican companies, the first of which has made this island famous the world over. The reef upon which these mills are located extends two-thirds the length of the island, and upon it have been located numerous claims. The Treadwell has recently let a contract for the erection of 520 additional stamps, which, when in operation, will make this group of mines the largest that the mining world has ever seen.

Like the mother lode of California, the mother lode of Alaska, or the great mineral belt, which extends along the coast of southeastern Alaska just back from the water's edge and which never fails to pay the careful prospector, has, of course, its spots of unusually rich value. At Berners Bay, 40 miles north of Juneau, on Lynn Canal, there was discovered some years ago ore of splendid promise. The principal mines in this very rich district are those of the Berners Bay Mining and Milling Company, the Jualin Mining and Milling Company, and the Portland and Alaska Mining and Milling Company. The Aurora Borealis has recently erected a 5-stamp mill on its property in this district, which will soon be ready for operation. The character of the Aurora is free milling, and is said to be one of the most extensive and richest paying viens in the district. The Mellin Mining and Manufacturing Company of Berners Bay will soon erect a 20-stamp mill on its property.

Many valuable locations have been made in the Ketchikan district, though no mills have yet been erected. It is one of the most promising mining districts on the coast, and is expected to add considerably to Alaska's gold output.

On the banks of Prince William Sound immense deposits of copper have been found, which bid fair to rival the famed Anaconda mine.

The mining carried on in the Lituya section is confined to the beach or ruby sand deposits that lie along the shore line some miles distant above the entrance to the bay. The first discovery of gold was made there a number of years ago, since which time washing has been carried on to a greater or less extent every season. The Lituya Bay gold commands the price of $18 per ounce. It is fine and somewhat scaly, but, being untarnished by rust, amalgamates readily, and but a very small per cent is lost in the tailings. The gold deposited along the shores is brought there by glacial action from the range back.

In conclusion, we wish to say that but a fraction of 1 per cent of this rich coast has ever felt the tread of the prospector, and a valuable field for operations is open to all who may come. The great success of this section of the country has inspired the breasts of capitalists with unlimited confidence in this country, and good undeveloped prospects find a ready sale. The chief virtue of prospecting on the coast of southeastern Alaska is the ability to keep in constant communication with a distributing point for supplies and the general evenness of the climate, which is not nearly as severe as the great majority of mining settlements throughout the world.

II.

ARIZONA.

By Geo. W. Cheyney,
Tucson, Arizona.

While considerable prospecting and development work was prosecuted during 1897, but few new mines were brought to a condition of production, and many well-known and, in the past, considerable silver mines had ceased operations.

By a tabulated list consisting of 88, known as mines, in distinction to mere prospects, but 47 produced in 1897, and from this list were excluded all those that have been idle for several years.

As characterized by their main product, these may be specified as 7 copper, 29 gold, and 11 silver. The mining of silver ores that has in the past been the main industry in several counties, especially Cochise, Pima, Mohave, and Gila, has practically ceased, although in Mohave considerable activity is reported in silver mining, and several properties in process of equipment that will produce in 1898.

Excepting as a by-product, silver can not be produced in Arizona at its present price, and the quantity in 1898 will probably be even less than in 1897.

The cessation of silver mining has also affected the production of lead, as they were frequently concomitant. But 521,000 pounds has been reported, and the quantity shipped in small lots that escaped record can not be considerable.

On the other hand, the search for gold and copper mines, both upon the part of prospector and capital, has been eager, and with continually encouraging results. All the well-known mines in both metals continued vigorously during 1897, several increasing in production and reduction facilities. Many properties are in process of development and equipment. Yavapai County perhaps more in gold, Cochise, Gila, and Pima in copper, and the record of production for 1898 will be considerably increased in both.

Other than gold, silver, copper, and lead, mineral production is small. Some of the rarer lead compounds have been used commercially in a small way, and nickel and cobalt have recently been discovered, it is hoped, in paying quantity. Turquoise exists in several known deposits worked to some extent and occasionally. Ruby bituminous coal exists in several sections of the Territory, but has not as yet been developed in paying quantity.

A recent industry in the quarrying and shipment of onyx is reaching considerable proportions. Deposits exist in several sections, apparently of very large extent, and will, with increase of transportation facilities, be largely produced.

Reports are too meager and incomplete to make the tabulation correctly, either of the method of production or point of direct disposition. The copper is nearly all produced in the form of pig, 98 to 99 per cent, and is generally shipped to New York, but a couple of million pounds, in form of matte, were marketed in Mexico.

No precious-metal smelting is done in the Territory. The silver ores, all the lead, and some of the copper are sent outside of the Territory for treatment, mainly to El Paso, Tex.

Plate amalgamation, frequently accompanied by concentration, is the usual method followed in the treatment of gold ores, although about 8,000 ounces were produced by the cyanide method.

Placer mining is almost unknown in Arizona. A little is done by the Mexicans and Indians during the rainy season, confined almost entirely to Pima and Yuma counties.

I have endeavored to secure from the merchants who deal with them the figures, and have noted in Pima County 270 ounces, Yuma County 350 ounces. All the rest is from quartz.

The silver product was derived as follows: Seventy per cent from quartz, 22 per cent from copper, 8 per cent from lead.

SUMMARY OF METAL PRODUCTION OF ARIZONA, BY COUNTIES, 1897.

County.	Gold.	Silver.	Copper.	Lead.
	Fine ounces.	*Fine ounces.*	*Pounds.*	*Pounds.*
Cochise	24,093	1,705,885	25,891,872	.....
Mohave	648	210,672	.....	84,258
Gila	800	.....	3,148,713	.....
Maricopa	1,720	.....	.....	.....
Graham	168	.....	22,217,949	.....
Pima	3,732	58,247	18,000	437,000
Pinal	4,071	12,824	3,500	.....
Yavapai	61,477	565,701	.....	.....
Yuma	25,350	21,000	.....	.....
Total	122,059	2,574,329	51,280,034	521,258

III.

CALIFORNIA.

By CHARLES G. YALE.

The production of precious metals in California during the calendar year 1897 is shown in detail, by counties, in the tables appended hereto. Summarizing these, it is shown that, by returns received at the San Francisco mint from producers, the yield of the State was as follows:

Gold	$15,871,401
Silver (commercial value)	452,789
Total	16,324,190

As compared with the figures obtained from the same sources in 1896, the gold yield of the State shows a falling off of $1,310,161, while the silver shows an increased product of $30,325 (commercial value), making the total decrease of the year 1897 from the preceding one $1,279,836. The last three months of 1897 were unprecedentedly dry ones in California and many mines were forced to close down for lack of water. This occurred with both quartz and gravel mines and had an appreciable effect on the gold yield. Then too, numerous miners who had been working for themselves in claims in different parts of the State went off to the Yukon or Klondike region in the fall. In the case of many of the larger mines the yield was materially reduced, owing to their having to "hang up" part of their stamps for want of water for a portion of the time in the latter part of the year. In one of the mother-lode counties, for instance, only two mines showed an increased product over the previous year, all the others showing reductions, which, in the aggregate, amounted to about $200,000 for the year. The leading gold-producing county of 1896 shows a falling off in yield for the year of nearly half a million dollars, yet this still continues to be the leading gold-producing county in 1897.

In 1896 there were seven counties of the State which produced over $1,000,000, and one of these yielded over two millions.

In 1897 there were but six $1,000,000 counties, and none of them reached the two-million mark. Nevada County, which held the place of honor in bullion product in 1896, still maintains its position in 1897.

But Tuolumne County, which ranked No. 7 in 1896, takes second place this year, displacing Placer, which is now third on the list.

Calaveras, which was third on the list, is now fourth in rank. Amador also drops back one place, being now fifth instead of fourth.

Trinity, which was fifth last year, is sixth in 1897, holding the place Siskiyou did the previous year, the latter county dropping out of the list of million-dollar producers for the time, at least.

It is interesting to note the relative proportions of bullion product as to its origin—alluvial washings or solid rock. Vein mining very greatly leads not only one, but all forms of gold washing combined.

The figures for California for 1897 are as follows:

Quartz mining	$11,390,130
Surface placers	2,379,914
Hydraulic mines	1,351,088
Drift mines	1,203,058

In the quartz total is included the silver output of $452,789 (commercial value). From copper ores (included in the quartz column) the product of gold was $149,406, and of silver $95,928. From silver-lead ores, mainly in Inyo and Mono counties, the gold production was $44,801 and the silver $54,100. Deducting these amounts of silver derived from the lead and copper ores, the remainder of the total was obtained by separation from the gold derived from quartz, placer, hydraulic, and drift mines, that is, of the total gold $194,207 was derived from copper and lead ores and $150,028 silver was derived from the same source.

It is proper to state that an undue proportion of the gold may have been attributed to the placers, as compared with hydraulic and drift mines, since all Chinese in the various camps not otherwise specified are counted as placer miners, as none of them work quartz.

Some actually hydraulic or drift mines may have had their product added to the placer column. The "small mines" in many districts or camps have been put in the same column, as the source of gold was not specified. It is, of course, impossible to be perfectly accurate in distributing the returns, as so many fail to specify the class of mining they are engaged in.

Both hydraulic and drift mines are "deep gravels" as compared with surface placers, which include bars, river beds, ravines, gulches, flats, etc. Where there is no lava capping to the deposit, it may be washed by hydraulic process, which consists in throwing against the gravel bank, under great pressure, large quantities of water through a nozzle, thus disintegrating the bank, carrying the gravel, rocks, gold, etc., into flumes where the gold is caught.

When the deposit is covered with lava, or where the conditions prevent washing away the whole bank, tunnels and drifts are run into the deposit and only the lower or richer stratum of gravel is removed, being taken to the surface in cars, where it is washed on floors and the gold recovered. If the gravel is "cemented," stamp mills crush it in about the same way that quartz is treated.

In the case of both hydraulic and drift mining, considerable capital is required to open and operate the mines, while with ordinary placers labor is usually all that is necessary, unless water has to be brought to the deposits.

The following table will show the relative importance of the different kinds of gold mining in the different counties of California:

SOURCE OF GOLD AND SILVER IN CALIFORNIA, 1897.

County.	Placer.	Hydraulic.	Drift.	Quartz.
Amador	$111,734	$4,970	$3,000	$1,208,246
Butte	315,865	22,205	122,132	214,708
Calaveras	61,086	16,245	4,329	1,359,946
Del Norte	16,210	500	.....	.....
Eldorado	44,345	6,022	17,990	607,155
Fresno	6,885	.....	.....	36,259
Humboldt	68,625	26,367	.....	57
Inyo	8,500	.....	.....	201,403
Kern	20,450	.....	.....	744,334
Lassen	.....	.....	.....	49,950
Los Angeles	13,028	.....	.....	27,670
Madera	17,780	.....	.....	68,183
Mariposa	17,324	.....	.....	434,763
Mono	3,000	.....	.....	589,592
Nevada	149,117	186,015	136,499	1,421,736
Placer	482,472	61,651	670,039	317,563
Plumas	179,903	21,852	16,622	130,576
Riverside	.....	.....	.....	151,227
Sacramento	65,514	27,536	.....	.....
San Bernardino	.....	.....	.....	154,780
San Diego	54,000	.....	.....	538,328
San Luis Obispo	500	.....	.....	2,000
Santa Barbara	3,000	.....	.....	.....
Shasta	26,400	1,408	3,500	634,632
Sierra	146,141	61,964	89,310	72,839
Siskiyou	262,494	353,099	115,713	110,851
Stanislaus	37,392	.....	.....	.....
Trinity	184,275	516,104	22,479	355,773
Tulare	500	.....	.....	12,544
Tuolumne	25,210	.....	.....	1,786,058
Yuba	67,164	45,150	1,445	27,879
Undistributed	.....	.....	.....	131,078
Total	2,379,914	1,351,088	1,203,058	11,390,130

Quite a number of hydraulic mines have been given permits to mine by that process by the California Débris Commission, and there are now several hundred working under Government license. The restriction upon this class of mines affects only those in the drainage basin of the Sacramento and San Joaquin rivers, and under it they must impound their débris, or tailings, to prevent waste material injuring the navigable rivers or the farming lands along their banks. In such counties as Siskiyou and Trinity, where there are no navigable streams to be injured, the hydraulic mines may be worked freely without the necessity of impounding the débris. For this reason this particular class of mining now flourishes most largely in those counties.

A comparatively new feature of late has been the introduction of *mining dredgers on the* Sacramento, Feather, American, and Klamath *rivers and their successful* work. In the past thirty years there hav

been numerous attempts and as many failures in this direction, but in the past two years, and particularly in 1897, types of dredgers have been put at work which take the gravel to the surface cheaply, so that some profit is made. No very important "strikes" have been made, and no very large fortunes have accrued, but the business appears to be reasonably profitable in a small way.

In the rate of wages paid miners there is more or less variation, depending on class of work and, to some extent, locality. The surface men in quartz, hydraulic, and placer mines are paid less than those who work underground, and the Chinese get less than the whites.

In Amador County, where the mines are mainly quartz and many of them very deep, miners' wages vary from $2, $2.50, $2.60 to $2.75 per day. In Butte County, where there are many placers, river-mining, quartz, and drift claims, wages run from $1.50 to $3 per day. In some cases $50 per month is paid, and in others $2 per day and board.

Calaveras pays from $1.50 to $2.75, the majority getting from $2.50 to $2.75 per day. In Del Norte the prevailing rate is $40 per month and board, the men being engaged principally in beach mining.

In Eldorado County wages are from $1.75, $2, to $2.50 per day; and in Fresno they run from $1.50 and board to $2.75. In Humboldt the men get $35 per month and board, and in Inyo the rate varies from $2.50 to $3. In Kern County the variation is quite great, there being some at $1.75, $2, $2.50, $3, $1.50 and board, and $65 per month. In Lassen the wages are $2.50; in Los Angeles $2.50 and $3; and Madera $2 to $3. In Mariposa the pay is $2, $2.50, $3 per day, and $65 per month. Mono County pays the highest rate of miners' wages in the State, most of the men receiving $4 per day, though some get but $3. Nevada County pays $2, $2.25, $2.50, $2.75, and $3, the largest number of men getting the latter wages. In Placer County, Chinese get $1.25, $1.35, or $1.50 per day; and whites are paid $2, $2.25, $2.50, $2.65, $2.75, $3, $3.50, according to nature of work. In Plumas County men are paid $40 to $50 per month and board, $1.50 to $2 per day and board, or $1.25 to $3 per day. Riverside County pays $2, $2.50, and $3 per day; and Sacramento, $1.75 per day. In San Bernardino County the wages are $2.50 to $3; San Diego, $2.50, $2.75, and $3; Santa Barbara, $2.00; and San Luis Obispo, $2.50 per day. In Shasta County the average wages of 1,051 men are $2 per day; 29, $1.50; 162, $2.50; 700, $2.55; 10, $2.75; 5, $3.50; and 7, $50 per month. Sierra County wages vary from $1.75 to $3, while some are paid $50 to $65 per month and board, or $2 per day and board. In Siskiyou County, where many forms of gold mining are carried on, there is considerable variation in pay of men; some are paid as low as $20 per month and board; others, $35, $40, $45, or $50; Chinese are working for $1.50 to $1.75, and whites, $2 to $2.50 per day. The few men in Stanislaus County get $2.50 per day. Trinity has about the same features as Siskiyou and rates of wages vary; monthly wages, with board, run $30, $40, or $45; Chinese get $1.25 and $1.50; and whites, $2.25, $2 $2.50, and a few, $3

per day. In Tulare County the wages are $2.50; in Tuolumne, $2.25, $2.50, $2.75, and $3; and in Yuba County, $2.50.

The appended table is an estimate of the number of men employed in the gold, silver, lead, and copper mines of the State. In sending out the blanks asking for bullion returns, questions were asked as to the number of men employed and rate of wages. In some cases no answers were received to these questions. Estimates were also obtained from postmasters, express agents, merchants, gold-dust buyers, bankers, etc., as to number of men employed in the various camps. Through these responses the information is derived from which the table is compiled. There are many hundreds of nomadic prospectors and men working on their own account in a small way who are not enumerated. The figures given are from direct returns and no estimates have been given. It is safe to say, therefore, in view of these facts, that there are more men engaged in various branches of precious-metal mining in the State than are here enumerated.

NUMBER OF MINERS EMPLOYED IN CALIFORNIA DURING 1897.

County.	Miners.	County.	Miners.
Amador	1,085	Riverside	240
Butte	653	Sacramento	175
Calaveras	1,064	San Bernardino	472
Del Norte	46	San Diego	662
Eldorado	943	San Luis Obispo	14
Fresno	271	Santa Barbara	12
Humboldt	63	Shasta	1,964
Inyo	258	Sierra	574
Kern	960	Siskiyou	977
Lassen	50	Stanislaus	20
Los Angeles	74	Trinity	1,126
Madera	138	Tulare	20
Mariposa	853	Tuolumne	957
Mono	214	Yuba	130
Nevada	1,163	Total	16,783
Placer	1,165		
Plumas	440		

PRODUCT OF CALIFORNIA BY COUNTIES, 1897.

RECAPITULATION.

County.	Gold.	Silver (commercial value).	Total.	County.	Gold.	Silver (commercial value).	Total.
Amador	$1,324,473	$3,477	$1,327,950	Kern	$754,313	$10,471	$764,784
Butte	667,025	7,885	674,910	Lassen	49,100	850	49,950
Calaveras	1,439,861	1,745	1,441,606	Los Angeles	40,698	.....	40,698
Del Norte	16,710	.....	16,710	Madera	85,963	.....	85,963
Eldorado	674,626	886	675,512	Mariposa	451,427	660	452,087
Fresno	43,144	.....	43,144	Mono	520,101	72,491	592,592
Humboldt	94,992	57	95,049	Nevada	1,885,251	8,116	1,893,367
Inyo	159,840	50,063	209,903	Placer	1,524,941	6,784	1,531,7[illegible]

PRODUCT OF CALIFORNIA BY COUNTIES, 1897—Continued.

RECAPITULATION—Continued.

County.	Gold.	Silver (commercial value).	Total.	County.	Gold.	Silver (commercial value).	Total.
Plumas	$339,252	$701	$339,953	Siskiyou	$842,123	$34	$842,157
Riverside	147,227	4,000	151,227	Stanislaus	37,392	.....	37,392
Sacramento	93,050	.....	93,050	Trinity	1,078,372	259	1,078,631
San Bernardino	100,373	54,407	154,780	Tulare	12,830	214	13,044
San Diego	592,328	.....	592,328	Tuolumne	1,809,572	1,696	1,811,268
San Luis Obispo	2,500	.....	2,500	Yuba	141,638	.....	141,638
Santa Barbara	3,000	.....	3,000	Undistributed	.....	131,078	131,078
Shasta	569,071	96,869	665,940	Total	15,871,401	452,789	16,324,190
Sierra	370,208	46	370,254				

COMPARATIVE OUTPUT OF CALIFORNIA FOR TWO YEARS, 1896 AND 1897.

County.	1896.	1897.	Decrease.	Increase.
Alpine	$400.00	.....	$400.00	.....
Amador	1,527,119.02	$1,327,950.00	199,169.02	.....
Butte	754,705.88	674,910.00	79,795.88	.....
Calaveras	1,546,898.85	1,441,606.00	105,292.85	.....
Del Norte	24,150.00	16,710.00	7,440.00	.....
Eldorado	812,823.22	675,512.00	137,311.22	.....
Fresno	28,334.60	43,144.00	.....	$14,809.40
Humboldt	65,092.85	95,049.00	.....	29,956.15
Inyo	347,126.48	209,903.00	137,223.48	.....
Kern	625,516.35	764,784.00	.....	139,267.65
Lassen	40,300.00	49,950.00	.....	9,650.00
Los Angeles	35,468.55	40,698.00	.....	5,229.45
Madera	105,579.84	85,963.00	19,616.84	.....
Mariposa	335,817.44	452,087.00	.....	116,269.56
Merced	1,250.00	.....	1,250.00	.....
Mono	533,837.31	592,592.00	.....	58,754.69
Nevada	2,389,340.42	1,893,367.00	495,973.42	.....
Placer	1,681,534.55	1,531,725.00	149,809.55	.....
Plumas	462,609.61	339,953.00	122,656.61	.....
Riverside	276,250.00	151,227.00	125,023.00	.....
Sacramento	133,050.00	93,050.00	40,000.00	.....
San Bernardino	227,436.80	154,780.00	72,656.80	.....
San Diego	560,618.00	592,328.00	.....	31,710.00
Santa Barbara	8,592.00	3,000.00	5,592.00	.....
San Luis Obispo	3,000.00	2,500.00	500.00	.....
Shasta	623,443.59	665,940.00	.....	42,496.41
Sierra	786,598.27	370,254.00	416,344.27	.....
Siskiyou	1,091,917.47	842,157.00	249,760.47	.....
Stanislaus	16,635.00	37,392.00	.....	20,757.00
Trinity	1,296,330.30	1,078,631.00	217,699.30	.....
Tulare	20,092.00	13,044.00	7,048.00	.....
Tuolumne	1,070,470.13	1,811,268.00	.....	740,797.87
Yuba	171,687.77	141,638.00	30,049.77	.....
Undistributed	.....	131,078.00	.....	131,078.00
Total	17,604,026.30	16,324,190.00	2,620,612.48	1,340,776.18

Total decrease for 1897, $1,279,836.30.

IV.

COLORADO.

By JAMES L. HODGES,
Assayer in charge United States mint, Denver, Colo.

Colorado's product for the calendar year 1897 was valued as follows:

Gold (at $20.67 per fine ounce)	$19,572,137
Silver (coining value, $1.29 per ounce)	27,178,475
Copper (at 10¼ cents per pound)	953,260
Lead (at 3¼ cents per pound)	2,773,403

The Leadville strike, which terminated in March, 1897, was the single labor trouble occurring in any camp of the State during the year.

The wage question seems to be fairly well adjusted to existing conditions in the various districts. In no instance was the scale of wages reduced, but in a few localities voluntarily raised. The number of men employed in metalliferous mining was about 20 per cent greater than in 1896, which means a relative increase in the number of those engaged in correlative employment and in business dependent upon mining.

Owing to cheaper transportation, reduced smelting charges on certain grades of ore, the employment of modern methods of concentration for reducing the bulk of low-grade smelting ores, the increased tonnage capacity of the cyanide and chlorination mills, and the general economy exercised in every department of mining, the tonnage output for 1897 over former years was relatively larger than the gross value of the product.

About 40 per cent increased tonnage over 1896 was handled by the smelters of the State, but this was largely affected by consignments of ore produced in neighboring States and Territories. A large portion of the increased tonnage of low and medium grade ores produced within the State was treated in local stamp mills and in the cyanide and chlorination works. The smelters were not obliged to enlarge their plants, as they have already had capacity in excess of the demand, but that condition has all but reached the end; therefore the year 1898 will witness the enlargement of some, if not all, of the leading smelters.

In the matter of treating low and medium grade refractory gold ores, the greatest advance was made in the chemical methods, to wit, cyanide and chlorination. Thus far these methods have attained the highest degree of success in treating Cripple Creek ores, though there are many localities in the State where the ore is adapted to such treatment, especially where roasting—a process of desulphurizing or oxidizing—is first employed.

Two small chlorination mills in Boulder County, a chlorination mill of 250 tons daily capacity at Colorado City, a combination cyanide and chlorination plant of 75 tons daily capacity in Cripple Creek, a new chlorination plant of 100 tons daily capacity at Florence, are among the new enterprises of this character, inaugurated in 1897. During the year, the large cyanide mill at Cyanide, near Florence, doubled its capacity. Nearly all the mills of this character improved and increased their facilities during the year until they now have an aggregate daily capacity of about 1,000 tons, and are all regularly employed.

New concentrating and amalgamating mills have been built and many old ones remodeled and equipped with the best machinery in almost every mining district in the State. Old methods and old machinery are rapidly being replaced by new, and well-rewarded efforts for a higher per cent of recovery is the general result. In this respect the operators of Boulder, Clear Creek, Park, Summit, Pitkin, Ouray, San Juan, Hinsdale, San Miguel, and Gunnison counties have been particularly active and successful.

The most noteworthy feature in connnection with the past year's mining is the gain in gold production, which amounts to $4,461,177 over that of 1896; while the increase credited to Cripple Creek was $2,626,797, every gold-producing county in the State scored an advance.

Present conditions promise substantial gains for 1898. Considering the low price of silver during the year, the product of this metal was surprisingly large, and this fact is especially emphasized when it is known that, due to the continued low price for the past five years, miners have not been encouraged to exploit new territory, and that there has been continuous exhaustion of old reserves. It may be said, however, that much of the silver mined at present in Colorado is found associated with gold, and is mined as a by-product to that metal. The uniformly fair ruling price of lead and copper, which are generally argentiferous, has helped to augment silver production.

The labor strike in Leadville in 1896 and 1897 caused the suspension of pumping in the large down-town mines. Up to this time the operators have been unable to effect an agreement in adjusting pumping expenses, which caused a large number of Leadville's greatest mines to lie idle the entire year, seriously affecting the State's production, and particularly the output of Lake County. Arrangements for unwatering and reopening these mines are in fair way to be consummated, and, if accomplished, the district will resume its former tonnage quota.

New mining camps have been established during the past year at Eldora, in Boulder County; at Freshwater, in Park County; at Cameron and Whitehorn, in Chaffee County, and in La Plata Mountains, in La Plata County. These and several other smaller camps that are attracting attention and receiving the helping hand of capital are promising gold fields, showing good surface values. Several proper-

ties in each of these new districts are receiving considerable development, and ore of pay value has been encountered.

Active prospecting in many localities has materially extended the area of known gold-bearing territory of the State. This has been the result in many of the older districts as well as in the newer.

The productive area of the Leadville gold belt has been very greatly extended. In La Plata County gold has been known to exist for more than twenty years, but not until the latter half of the past year did that section receive the attention it merited. The recent discovery of exceedingly high-grade gold and silver tellurides is awaking interest.

Placer mining, once the chief source of gold production, was relatively a small factor in 1897. The placers of Boulder, Gilpin, and Clear Creek counties were operated in a small way and produced fairly well. At Granite, in Chaffee County, at Twin Lakes, in Lake County, and in Park and Summit counties placer mining was conducted on a more pretentious scale and was generally remunerative. On Sangre de Cristo Creek, in Conejos County, an expensive steam excavating plant was installed and operating tests made during the year. These tests are said to have been satisfactory, and extensive work is promised the coming season.

A number of new companies are equipping and preparing for extensive hydraulic operations in Summit, Park, Boulder, and Routt counties. In the latter county are found some of the most extensive undeveloped placer deposits in the State.

Almost every important district in the State is reached by one or more railroads, and such localities as are not now provided with railroad facilities will doubtless be connected by branch lines as soon as their volume of business warrants.

A spirit of liberality in the adjustment of freight charges, based on the value of ore, is the general rule, and has contributed much to stimulating the production and marketing of the lower-grade ores.

The unexcelled water supply for the generation of electric power for driving mining and milling machinery is beginning to receive favorable attention, and wherever employed is an economic success. The best examples of its application are found in Aspen; on a number of mines in Ouray County; in the Revenue Tunnel and Virginius mine; in San Juan County; in the Silver Lake mines and mill, and in San Miguel County, where, from one large central station, power is successfully transmitted from 5 to 15 miles and applied to mining and milling machinery.

BOULDER COUNTY.

The excitement over discoveries in and around the new camp of Eldora has attracted marked attention to this county. The county contains an area of about 700 square miles, and has been heretofore slow in developing its mineral resources. Recent explorations show that the

sulphide belt, which has been so productive in Gilpin County for the past forty years, extends through the western part of this county. The deepest workings range from 500 to 850 feet, and it is noticed that ore bodies increase in value and extent, as a rule, wherever considerable depth has been attained. In addition to the "sulphide" veins there is a belt of tellurium veins, some of which have been productive of very high-grade ores. There is much undeveloped mineral-bearing territory. The district has been handicapped by lack of transportation facilities, all materials and ores having to be hauled in wagons between mines and Boulder, making it unprofitable to handle any but high-grade ores. This difficulty will now be largely overcome by the Colorado and Northwestern Railway, which is already constructed from Boulder, up Boulder Creek Canyon, to Sunset, a distance of 13 miles, and will reach Ward, one of the most productive camps, 27 miles from Boulder, by the 15th of April, 1898. Arrangements have been made, also, to extend a branch of this railway to Eldora during the summer of 1898. The wagon roads are generally in fair condition, where made, but great saving in cost of handling ores can be effected by improving roads, building tramways, etc. There are now about 100 shipping mines in the county. About 1,800 men are engaged in mining and prospecting; wages of miners being $2.50 to $3 per day.

The production of 1897 was: Gold, $541,453; silver (at coining value), $174,134; lead, $10,445; copper, $6,210.

Much activity is noticed along the line of the new railway, new plants of machinery and improved mills being erected at a number of places. The camp of Wall Street, 10 miles from Boulder, on this railway, is a notable example. The mines in the vicinity of this camp are producing a large amount of high-grade tellurium ore. As an example of the extensive developments under way and projected in this district, a single company has acquired about 100 claims. This company has started the Wall Street Tunnel, which will cut the veins on about 30 of these claims, some of them at a depth of 1,500 feet. Most of these veins have been opened up with workings from the surface, and show values that justify the immense undertaking, which will tend to greatly increase and cheapen production. This tunnel is being pushed rapidly with improved machinery, and will afford a drainage and double-tracked highway for transportation of ores from many veins known to be rich in gold.

The principal city in the county is Boulder, 30 miles from Denver. This is a city of about 6,000 inhabitants, and which is the natural base of supplies and point for sampling and treatment of ores for almost the entire county. There is a good supply of water and excellent coal mines but a few miles from the city. The surrounding country is devoted to agriculture and capable of supplying products of that industry to the large population that will occupy the mineral section in the development and working of the mines.

There are four mills operating successfully in Boulder, showing a daily capacity as follows:

	Tons.
Chlorination	60
Cyanide	10
Concentrating	10
Sampling	80
Total	160

One chlorination mill of 50 tons daily capacity is complete in every respect and very successful in treatment of tellurium ores. There is expected to be in operation by May 1, 1898, a very modern combination stamp and concentrating mill, which will have a daily capacity of about 200 tons. This mill is especially intended to handle the lower grade ores which it is proposed to bring down by the new railway. The mills now in operation outside the city of Boulder consist of 14 stamp mills, of about 200 tons capacity, and 2 concentrating mills, of 65 tons. A number of the stamp mills are used for crushing ores for concentrating tables and do not attempt to save the gold by amalgamation, as is the common practice in Gilpin County.

About an equal number of mills are idle. This has been a favorite field for experimental mills and processes on account of the variety of ore produced. Many of the idle mills were of this character. At Springdale is being erected a modern stamp mill of 20 tons capacity. At Sunshine a "Beam" process mill of 25 tons capacity is nearing completion.

Placer mining has been conducted in this county for a number of years on quite an extensive scale. During 1897 about $75,000 was produced along the streams which traverse the county and about 150 men were employed during summer months.

A brief description is given of the new camp at Eldora, which is attracting wide-spread attention and is typical of the rapid development which follows discoveries of the precious metals in quantities or so generally distributed within a fixed area as to induce prospectors to rush in and locate all ground showing indications of mineral.

This is the case at Eldora. Where three months ago there were not 200 people there has sprung up a thriving mining city of nearly 2,000 inhabitants. But very little actual development has been done, the deepest mine being but 170 feet and but half a dozen having shafts over 100 feet in depth, but the surface indications and returns from ores taken from shallow workings are remarkably fine. Veins showing good values in gold are very numerous over a territory of about 30 square miles. Some of the developments of Spencer Mountain, south of the town, show the remarkable fact that well-defined veins of sulphide ores, having all the characteristics of Gilpin County mines, are intersected and crossed by veins of tellurium ores carrying very high values. The deepest mine in the district is on this mountain, and at a depth of 170 feet has a good showing of tellurium ore in place, between

well-defined walls, returning assays of $300 to $500 per ton in mill-run quantities. The Eldorado Mountain, to the north of the town, is covered with locations, and many shafts 25 to 100 feet deep show good bodies of sulphide ores.

The best-developed mines are rather high, on steep mountains, and, while showing ore of fine grade, can not ship until snows melt off and roads or tramways are put in shape.

CHAFFEE COUNTY.

CAMERON AND TURRET MINING DISTRICTS.

This mining territory runs nearly east and west from 12 to 15 miles and is 5 miles wide. The following towns are in these districts, and are reached by stage from Salida: Whitehorn, Calumet, Cameron, Heron Park, Turret, Klondike, Harrington, Cable City, Nelson, and others.

The country rock is almost entirely granite, with quartzite and lime in southern parts. The veins appear genuine fissures, carrying gold in a brown hematite, running nearly east and west. Pay ore is in streaks of from 1 to 18 inches. Values are almost entirely in gold.

About 25 per cent of the ores can be treated by stamp mills and concentrators. There are about 400 or 500 miners, paid at the rate of $3 per day. The deepest shaft is 225 feet. One tunnel is 230 feet, two others 175 feet each, and eighteen over 100 feet. Several claims show copper from 10 to 15 per cent, and in one case as high as 40 per cent. One mile north of Turret a seam of lead 16 inches thick has been discovered. Mill runs of 800, 2,800, and 3,500 pounds averaged $68 per ton, 75 per cent being gold.

The old Monarch mining district, 20 miles west of Salida, has but one mine regularly shipping at present. The ore is lead sulphide, carrying 20 per cent lead, one-half ounce gold, 12 ounces silver. A number of other properties are preparing to ship. About 200 miners are employed, receiving $3 per day.

Pass Creek mining district, 13 miles southwest of Salida, had considerable work done ten years ago, but did not pay then. Three properties will now be worked. The ore is a free-milling and concentrating quartz. The deepest shaft is 80 feet.

Bear Creek mining district, 7 miles south of Salida, is a new camp. Six or eight properties are being developed. Mill runs give $7 in gold, 28 ounces silver and, 40 per cent lead.

Another district, 18 miles east of Salida, is being prospected, the ore carrying one-tenth to one-half ounce gold and 12 to 28 per cent copper.

CLEAR CREEK COUNTY.

This county contains an area of about 500 square miles, and has long been noted for large production of silver, lead, and gray copper ores from mines in vicinity of Silver Plume and Georgetown.

The decline in price of silver the last few years has resulted in lessening activity in those mines and at the same time caused more systematic search for and development of territory showing gold values, with the result that the output of the county in gold now promises to exceed in value the high records formerly made in silver production. Commencing at Empire, a few miles east of Georgetown, and extending east and north to the line of Gilpin County (being part of what is now known as the "Sulphide" belt which extends north through Gilpin and Boulder counties), gold discoveries have been made and developed into paying mines.

The center of operations is Idaho Springs, 37 miles from Denver. During 1897 many gold-producing properties were added to list of shipping mines, and a remarkable increase, approximately 60 per cent, was shown in the gold product of the district over 1896.

The production of the county for year 1897 was:

Gold	$782,006
Silver (coining value)	1,810,920
Lead	175,900
Copper	53,901
Total	2,822,727

It is fairly estimated that the product of gold for 1898 will be over $1,000,000, and will make up for any falling off in value of silver produced. There are now about 250 shipping mines in the county, employing about 2,000 men. The leasing system is largely in vogue, and many miners are earning good pay on shares with owners. Wages of miners and mine laborers range from $2.25 to $2.75 per day, and engineers and timbermen $3 per day. No trouble has been experienced from labor agitations. Many new plants of machinery are being placed, and large plans for development by extensive tunnels and deep shafts are projected. The ores throughout this "Sulphide" belt are found in fissure veins between walls of granite or granite and porphyry. Their permanent character has been well established, explorations in adjoining (Gilpin) county having reached a depth of between 2,300 and 2,400 feet in ore. Many shafts in Idaho Springs district are from 500 to 1,200 feet deep, with no diminution in quantity or value of ores. The general character of ore obtained at depth is sulphide of iron and copper, containing principal value in gold and carrying some silver and copper. When values run over $20 per ton, ores are sold to samplers or shipped direct to smelters; if lower grade, to stamp mills or concentrators. Transportation between the mines and mills and railway yards is conducted by wagon, and, while some of the roads are good, much saving could be effected by improvements in roads, construction of tramways, etc. Such improvements are certain to follow development of the many fine prospects in this section, and a permanent and steadily increased production is predicted for years to come.

The proportion of capital from outside the State invested and operating in this county is estimated at 65 per cent. There are 20 mills now in operation, as follows:

	Tons.
Stamp mills, daily capacity	350
Concentrating, daily capacity	250
Sampling, daily capacity	200
Total	800

But few of these mills are now running to their full capacity. There are idle in the county 19 mills, as follows:

	Tons.
Stamp mills, daily capacity	230
Concentrating mills, daily capacity	465
Total	695

Probably one-half of these idle mills will start up during spring and summer, as many of them are so located that scarcity of water supply compels them to shut down during winter months. The fact is apparent, however, that construction of mills in this county was ahead of development of available supplies, but it is expected that before the end of this year such developments will bring the production of ores more nearly to a level with mill capacity.

A good feature is the extensive use of water power, about half the mills being driven by power from the abundant waters of Clear Creek and its branches. The operation of such is very economical, though they occasionally suffer from freezing up of source of power in winter months.

Placer mining has been profitably carried on for about thirty years along Clear Creek and some of its branches in the neighborhood of Idaho Springs, but the territory is rather limited and this branch of the industry is constantly diminishing in importance. The placer production for the year 1897 was approximately $50,000, about 150 men being employed during the summer months.

DOLORES COUNTY.

PIONEER DISTRICT, RICO.

Two hundred men employed; tunnel, 3,000 feet; character of ore, sulphides and carbonates, carrying 50 per cent silver, 15 per cent gold, and 35 per cent lead; 75 per cent foreign, balance Colorado capital; mines dry; steam power; miners' pay, $2.50 per day; two 20-stamp mills.

LONE CONE DISTRICT, RICO.

Fifty men employed; no vertical workings; longest tunnel, 1,000 feet; character of ore, sulphides, carrying 75 per cent gold, 25 per cent silver; capital, 50 per cent foreign, balance Colorado; mines dry; water

and steam power; miners' pay, $2.50 per day; 1 smelter, no mills; 1 concentrating mill in course of erection.

MONTROSE COUNTY.

PARADOX DISTRICT.

Eighty men employed; greatest depth, 100 feet; copper sulphides, carrying 10 per cent free milling gold; 75 per cent foreign capital; mines dry; water power; wages, $3 per day.

CHIPETA DISTRICT.

Thirty men employed; greatest depth, 80 feet; copper sulphides, carrying 20 per cent free milling gold; local capital; mines dry; water power; wages, $3.

CIMARRON DISTRICT.

Twenty men employed; greatest depth, 120 feet; character of ore, iron and copper sulphides, carrying 60 per cent gold, 40 per cent silver; local capital; mines wet; water power; wages, $3 per day.

MINERAL COUNTY.

KING SOLOMON DISTRICT, CREEDE CAMP.

Twenty-five men employed; greatest depth, 400 feet; character of ore, lead sulphides, carrying 75 per cent lead, 15 per cent gold, 10 per cent silver; practically all Colorado capital invested; mines wet; steam power employed; miners' pay, $3 per day; two concentration mills; ores smelted.

SUNNYSIDE DISTRICT, CREEDE CAMP.

Four hundred men employed; greatest depth, 1,600 feet; character of ore, silica, carrying 20 per cent lead, 70 per cent silver, and 10 per cent gold; capital all Colorado; mines wet; steam power; miners' pay, $3 per day; concentration and smelting; two mills, one 10-stamp and one 50-ton concentrating.

They are driving the Nelson tunnel at the rate of 12½ feet per day. This will drain the principal mines in this district and increase the output for 1898 very materially.

LA PLATA COUNTY.

LA PLATA DISTRICT.

Two hundred and seventy men employed; greatest depth, 200 feet; character of ore, iron and copper sulphide and tellurium, carrying gold and silver; 20 per cent foreign capital; mines wet; water power; miners' pay, $3 per day; 3 stamp mills; Englehardt mill, 35 per cent of product of district, can be treated successfully by cyanide process.

OURAY COUNTY.

MOUNT SNEFFLES DISTRICT.

Seven hundred men employed; greatest depth, 2,200 feet; iron and copper sulphides and lead carbonates, carrying 35 per cent gold, 40 per cent silver, 15 per cent copper, 10 per cent lead; mining territory in district extended largely during year; 40 per cent foreign capital, balance Colorado; mines wet; water, steam, and electric power; miners' wages, $3 per day; concentration and amalgamation; 5 concentrating mills. The mining properties of Red Mountain district for the present are at a standstill.

UNCOMPAHGRE DISTRICT.

Three hundred men employed; greatest depth, 800 feet; tunnel, 2,000 feet; iron and copper sulphides and lead carbonates, carrying 30 per cent gold, 40 per cent silver, 20 per cent lead, 10 per cent copper; 10 per cent foreign capital; mines dry; steam power; miners' wages, $3 per day; 5 mills.

SAN JUAN COUNTY.

EUREKA DISTRICT, SILVERTON.

Two hundred men employed; greatest depth, 400 feet; character of ore, iron, copper, and lead sulphides, heavy silver, carrying 4 per cent gold; Colorado capital invested; mines dry; water power; miners' pay, $3 per day; concentration and smelting; one 10-stamp mill.

ANIMAS DISTRICT, SILVERTON.

One thousand two hundred men employed; greatest depth, 600 feet; character of ore, iron, copper, and lead sulphides, carrying heavy silver and 40 per cent gold; 25 per cent foreign capital, balance Colorado; mines dry; water, steam, and electric power; miners' pay, $3 per day; probable increased production of 50 per cent over 1897. Amalgamation, concentration, and smelting processes; 9 mills operating 300 stamps and 2 mills using Huntington process and jigs; 3 concentrating mills projected.

SAN MIGUEL COUNTY.

IRON SPRINGS DISTRICT.

One hundred and fifty men employed; greatest depth, 1,000 feet; character of ore, sulphides, carrying 30 per cent gold, 35 per cent silver, 35 per cent lead; capital, all foreign to Colorado; mines, dry; water power; miners' pay, $3 per day; concentration and amalgamation; two 10-stamp mills; one 10-stamp mill in course of erection.

IRON SPRINGS DISTRICT AT OPHIR.

One hundred and fifty men employed; greatest depth, 1,200 feet; character of ore, iron and lead sulphides and lead carbonates, carrying

gold, silver, lead, and iron; capital, 90 per cent foreign to Colorado; miners' pay, $3 per day; water power; mines, dry; concentration and amalgamation; three mills, operating 60 stamps; one 30-stamp mill in course of erection.

TELLURIDE.

Fifty men employed; greatest depth, 200 feet; character of ore, lead carbonates, carrying gold and silver; all Colorado capital; mines, dry; miners' pay, $3 per day; no mills. This is the new camp at Saw Pit.

UPPER SAN MIGUEL DISTRICT, TELLURIDE.

Seven hundred and fifty-three men employed; greatest depth, 1,400 feet; character of ore, iron and copper sulphides, carrying 65 per cent gold, 33 per cent silver, 2 per cent lead; 50 per cent capital foreign to Colorado; mines, dry; steam and electric power; miners' wages, $3 per day; concentration, amalgamation, and smelting; six stamp mills, operating 280 stamps, and one Huntington plant, representing eight Huntington mills; one 10-stamp mill in course of erection.

MOUNT WILSON DISTRICT.

Three hundred men employed; greatest depth, 800 feet; free milling quartz, iron, and copper sulphides, carrying 80 per cent gold, 18 per cent silver, and 2 per cent copper. Fifty per cent foreign capital, balance Colorado. Mines dry; steam power; miners' pay, $3 per day; amalgamation and concentration; one 10-stamp mill.

EL PASO COUNTY.

CRIPPLE CREEK MINING DISTRICT.

This now famous district is actively shipping from an area of about 9 miles long by 4 wide.

Properties are being energetically developed 3 miles farther west. Five thousand men are working in the district, about one-third on leases and 200 prospecting. Wages, $3 per day of eight hours; engineers, $4, and skilled labor (men running air-drills, etc.), $3.50 to $5 per day.

The deepest shaft is 1,000 feet, and there are five others over 800 feet; longest tunnel, 2,000 feet.

The ore is a sulphide, carrying about 99 per cent of value in gold. It occurs in fissure veins coming up from the granite and through the porphyry capping of from 100 to 1,000 feet thick.

The mines are generally dry, the average water level being from 350 to 400 feet. Some shafts at 700 feet have not encountered water. About 3,000 gallons of water is pumped in the entire district per minute.

About 10,000 steam horsepower is used, and it is expected that about 3,000 electric horsepower will speedily be employed. An increased output of from 20 to 25 per cent both in tonnage and value of ore is

expected for 1898. From 1,200 to 1,300 tons of ore of an average value of from $35 to $40 per ton are being shipped from the district daily.

The ores are mostly smelting. Some are treated by the cyanide process, and the tailings or concentrates then sent to the smelters, while most of the ore of a value of $30 per ton and upward is consigned directly to the smelters.

There are six stamp mills with other combinations for concentration, etc., in the district, three having a total of 150 stamps.

There are four cyanide plants, some having other chemical additions, chlorination, etc., of a capacity of 375 tons per day.

Two large cyanide plants are operating at Florence and one at Colorado City, having a total capacity of 850 tons per day, working the Cripple Creek ores. The cyanide plants employ one man for about each two tons treated per day.

GILPIN COUNTY.

This is the smallest county in the State, containing an area of less than 150 square miles, but its history presents some remarkable features in connection with the mining industry.

The bulk of the mineral production of the county, covering a period of thirty-nine years, has been from an area of less than 40 square miles, and from this area there has already been produced very nearly $100,000,000, with no indications of early exhaustion of ore deposits. This exceeds the records of production of any similar area. This producing territory is in what is now known as the "sulphides" belt, which extends through parts of Clear Creek, Gilpin, and Boulder counties. The values in this belt are principally in gold, though most of the ores also carry a percentage of silver and copper.

The ores are found in fissure veins, generally between walls of granite, though some dikes of porphyry traverse the territory. The permanent character of these veins has been well established by explorations reaching a depth, in one instance, of between 2,300 and 2,400 feet—said to be the deepest gold mine in the State. Numerous workings have followed them to depths of from 500 to 1,200 feet, with continuous and increasing production.

The ores found above a depth of 100 to 200 feet are generally a honeycombed quartz, the base metals having been oxidized and leached out, leaving gold values in silica. These ores are frequently very rich, but in cases where values are moderate—not high enough to pay shipping and smelting charges—the stamp mills do not seem to treat them successfully, attributable to lightness of ores and fine particles of gold being coated with oxides, preventing amalgamation. There is prospect of a chemical (chlorination or cyanide) mill being erected at Blackhawk during the coming summer for handling such ores, which will result in an additional saving of values and the treating of quantities of ores which have been lying on the dumps for years.

The general character of ores obtained at greater depths is sulphide of iron and copper, which when values are over $20 per ton, are sold to samplers for shipment to smelters. Lower grades are generally free-milling and treated at the stamp mills. During 1897 about 60,000 tons of smelting ore and concentrates were shipped, yielding about $40 per ton. About 240,000 tons of lower grade were treated at stamp mills, yielding (not including concentrates) about $5 per ton, making the general average yield of ores about $12 per ton.

The transportation facilities in this county are excellent, nearly all the mines being easily accessible to mills and railway yards by good wagon roads. A specially good feature in the hauling of supplies to mines and ores to the mills and railway yards is furnished by the Gilpin County Tramway Company, which operates a 2-foot gauge railway, with ore-dump cars of about 8 tons capacity, and which has about 20 miles of tracks and switches winding among the hills and reaching most of the large producing mines, with switches to various stamp mills and sampling works. A saving of from 50 cents to $1 per ton in hauling ores is realized by those mines having service of this system.

There are at present 125 shipping mines in the county and prospects are bright for material additions to this number during the coming spring and summer. There is much activity noticed in putting in new machinery. A great amount of work is being done looking to the development of new properties and increasing output of old mines. It is conservatively estimated that the county will increase its output 10 to 15 per cent during the year 1898.

Mines of this county are very largely operated by capital from outside the State, an estimate placing the proportion of foreign capital employed at 75 per cent. Mines are essentially dry. Those operating steam plants haul coal for fuel from railway yards at Central City or Blackhawk, about all the timber having been cut off and consumed, except in some of the undeveloped districts.

A careful canvass shows that 2,160 men are employed in the county as miners and mine laborers, and about 300 men as managers, assayers, clerks, and in the transportation and handling ores at mills, and samplers. Wages of miners are $2.50 and $2.75 per day; of engineers and timbermen, $3 per day. The thrift and steady habits of the men are pronounced, many of them owning homes and having lived for years in the county. Mining operations are never hampered by strikes in this territory.

The mills in operation consist of—

	Tons.
18 stamp mills, daily capacity	870
2 sampling mills, daily capacity	150
1 concentrating mill, daily capacity	75
Total	1,095

Additions being made in present mills will add to daily capacity 125 tons, and changes from slow to fast drop stamps will add to same 125

tons. There are idle—partly on account of being located where the water supply is cut off by freezing in winter, expected to start up with melting of snows in the spring—4 stamp mills, daily capacity 55 tons; 1 concentrating mill, daily capacity 25 tons.

There is under construction a "Beam" process mill, adding to daily capacity 50 tons. Complete total, 1,475 tons, or a capacity for handling about 450,000 tons of ores per annum. The running of all these works to full capacity would mean a product of about $5,000,000 for the year, average amount saved being something over $11 per ton.

Placer mining, which was a prominent feature of the county's production in the earlier years, has been greatly lessened by reason of scarcity of water supply in some of the rich sections. The largely increased use of water in stamp mills in operating steam hoisting plants and for domestic purposes has diverted the supply and made it difficult to secure sufficient for gold washing. About fifty men are, however, profitably employed during the summer months in this branch of mining in territory adjoining Boulder County, known as the "South Boulder" district.

The county seat and principal city is Central City, 40 miles from Denver, on Colorado Central Branch of the Union Pacific, Denver and Gulf Railway. Most of the shipping and milling is done, however, at Blackhawk, a thriving town adjoining Central City, but situated so as to be able to use waters of Clear Creek, and by reason of circuitous routes necessary to attain additional altitude of Central City, 4 miles by rail nearer to Denver.

LAKE COUNTY.

LEADVILLE MINING DISTRICT.

There are two distinct belts in this district, one carrying lead, silver, and iron, the other gold, silver, lead, and iron, of which the gold averages one-half of the value of the ores mined in the gold belt. The ore is of the form of carbonates and sulphides, found in pockets or bodies in lime, the deposits being classed as blanket deposits or veins.

About 1,500 miners are working in the district, whose wages vary considerably, $2.50 per day of ten hours being paid in dry and $3 to $3.50 per day of eight and nine hours in wet mines.

About one-third of the above number work on leases. Skilled machine men receive from $3.50 to $5 per day; engineers, $4 per day.

The deepest shaft is 1,250 feet and is pumping 1,000 gallons of water per minute. There are six shafts, from 900 to 1,200 feet deep, and the Yak tunnel is now in 6,800 feet and progressing at about 225 feet per month. It is intended to work and drain a number of mines in the gold district.

All of the ores from this district are smelting, and so far no other process or mills have succeeded in saving as large per cent of values or working as economically as the smelters.

The gold district is being extended in a southeasterly direction and

at present is about equal in size to the silver belt. All silver ores carry about one-third of 1 per cent value in gold.

The Leadville district has been chiefly developed by home capital, not more than 10 per cent being foreign to Colorado.

The mines are wet, and about 2,000 gallons of water per minute is being pumped from each of the two mineral belts.

Steam to the extent of about 4,500 horsepower is used throughout this district, and about 3,500 horsepower formerly used for pumping what is known as the down-town mines, in addition to the above, is now idle.

When the pumps in this part of the district were stopped, owing to the labor trouble of 1897, they were throwing 3,500 gallons of water per minute. If they are again started up, about 4,500 gallons per minute would be pumped for the first year.

An estimated increase of tonnage and value of 25 per cent is looked for during 1898, a large part of which will be from the gold belt. If the mines in the down-town district are discharged of water, they will add 300 tons, averaging about $20 per ton, to the daily output of the district, which is now from 1,200 to 1,300 tons per day; gross value, about $20 per ton.

There are two smelters operating, having a capacity of 600 tons. Three concentrating plants are of 300 tons capacity per day. The labor trouble of 1897 decreased the output of the district about 30 per cent.

PITKIN COUNTY.

ASPEN MINING DISTRICT.

The mining area of this district is about 3 miles long by 1 wide. The ore, argenite and metallic silver, is dry and found in pockets or bodies in contact veins in lime, between lime and shale. It carries about 90 per cent silver, 10 per cent lead.

About 700 miners are at work in this district, the pay being $2.50 per day of eight hours, one-third working on leases. The general average for leasers is from $3 to $3.25; skilled machine men average $3.75 per day; engineers, $4 per day.

The deepest shaft in this district is 1,200 feet. A tunnel 5,000 feet in Aspen Mountain drains the mines to an average of 500 feet, and one in Smuggler Mountain of 12,000 feet to an average depth of 600 feet. Moreover, about 2,000 gallons of water per minute is pumped in the district. The mines are very wet.

About 4,000 horsepower is employed in the district, equally divided between steam and electricity generated by power from the Roaring Fork River. Properties have been largely developed by Colorado capital.

The prospect for 1898 is good, and an increase of from 5 to 10 per cent in value and tonnage is looked for, due to reduction in railroad charges and the erection of concentration plants, enabling lower-grade ores to be profitably handled. There are four concentrating plants in this district, having a total capacity of 500 tons per day, and a stamp and

combination mill at Independence (tributary to Aspen) of 100 tons, capacity.

This mill is intended to work a mine carrying gold in quartz above the water level, about 150 feet deep. Below that the ore changes to a sulphide. This district was worked for a number of years and considerable gold saved until the water level was reached in 1893.

The Smuggler mine fire and the resulting gases is estimated to have reduced the 1897 output of the district 10 per cent.

It is exceedingly difficult to determine with comparative accuracy the amount of Colorado's gold product for 1897, derived, respectively, from placer and quartz sources, and the amount of silver attributable to so-called lead and copper ores. The best information is to the effect that less than 1 per cent of the 1897 product came from placers, and that 80 per cent of the silver production is associated in the ore with more or less lead or copper.

PRODUCTION OF COLORADO FOR 1897, BY COUNTIES.

County.	Value of gold.	Coinage value of silver.	Total value of gold and silver.	Value of lead.	Value of copper.	Total value.
Arapahoe	$1,241	$16	$1,257	.....	.....	$1,257
Boulder	541,453	174,134	715,587	$10,445	$6,210	732,242
Clear Creek	782,006	1,810,920	2,592,926	175,900	53,901	2,822,727
Chaffee	196,895	67,610	264,505	55,010	18,098	337,613
Conejos	126	.....	126	.....	.....	126
Costilla	786	13	799	1,685	45	2,529
Custer	1,289	33,696	34,985	70,012	89	105,086
Dolores	32,566	225,641	258,207	36,700	4,128	299,035
Douglas	106	1	107	.....	.....	107
Eagle	35,887	57,803	93,690	38,555	226	132,471
El Paso	10,139,708	73,912	10,213,620	177	145	10,213,942
Fremont	8,486	1,915	10,401	.....	.....	10,401
Gilpin	2,197,384	470,018	2,667,402	66,901	101,713	2,836,016
Grand	273	.....	273	.....	.....	273
Gunnison	29,797	130,480	160,277	35,103	288	195,668
Hinsdale	140,044	305,595	445,639	188,015	845	634,499
Huerfano	.....	.....	.....	34	.....	34
Jefferson	5,753	2,026	7,779	34,700	166	42,645
Lake	1,921,071	6,843,616	8,764,687	812,762	328,412	9,905,861
Larimer	805	37	842	.....	.....	842
La Plata	21,388	65	21,453	27	41	21,521
Montrose	2,067	22	2,089	.....	.....	2,089
Mineral	40,380	3,854,593	3,894,973	203,476	154	4,098,603
Montezuma	1,862	14	1,876	.....	.....	1,876
Ouray	514,950	3,485,297	4,000,247	301,712	228,206	4,530,165
Park	115,597	250,995	366,592	16,478	6,171	389,241
Pitkin	158,828	5,774,460	5,933,288	220,133	879	6,154,300
Rio Grande	7,281	9,283	16,564	406	.....	16,970
Routt	5,817	7,856	13,673	2,994	112	16,779
Saguache	8,003	2,145	10,148	311	321	10,780
San Juan	933,805	1,683,257	2,617,062	302,766	152,101	3,071,929
San Miguel	1,469,163	1,266,709	2,735,872	141,117	36,792	2,913,781
Summit	257,320	646,346	903,666	57,984	14,217	975,867
Total	19,572,137	27,178,475	46,750,612	2,773,403	953,260	50,477,275

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT AT DENVER, COLO., DURING THE CALENDAR YEAR 1897.

County.	Gold.	Silver.	Total.
COLORADO.			
Arapahoe	$538.40	$2.61	$541.01
Boulder	66,945.00	154.13	67,099.13
Clear Creek	84,051.39	689.60	84,740.99
Chaffee	56,757.01	347.09	57,104.10
Conejos	126.17	.43	126.60
Costilla	640.64	4.84	645.48
Douglas	106.43	.51	106.94
El Paso	3,206,706.11	5,070.13	3,211,776.24
Eagle	3,199.84	13.51	3,213.35
Fremont	390.23	2.14	392.37
Gilpin	702,471.13	5,153.79	707,624.92
Gunnison	53.38	.39	53.77
Grand	272.96	.35	273.31
Hinsdale	284.97	.22	285.19
Jefferson	586.34	2.70	589.04
Lake	9,438.78	57.07	9,495.85
La Plata	1,979.13	11.96	1,991.09
Las Animas	186.34	.67	187.01
Mineral	529.40	6.05	535.45
Montrose	1,570.57	12.15	1,582.72
Montezuma	1,861.52	14.08	1,875.60
Ouray	3,156.43	23.04	3,179.47
Park	19,575.23	127.18	19,702.41
Routt	5,451.45	67.63	5,519.08
Saguache	4,905.53	43.85	4,949.38
San Juan	10,986.80	86.35	11,073.15
San Miguel	252,023.51	3,111.59	255,135.10
Summit	49,485.22	488.72	49,973.94
County unknown	851,043.93	11,987.07	863,031.00
Smelter deposits	6,423,203.46	826.98	6,424,030.44
Total	11,758,527.30	28,306.83	11,786,834.13
FOREIGN TO COLORADO.			
Alaska	5,503.59	38.54	5,542.13
Arizona	83,585.55	432.67	84,018.22
British Columbia	140.09	.44	140.53
California	11,624.47	37.66	11,662.13
Idaho	3,076.65	3.03	3,079.68
Mexico	4,694.03	69.04	4,763.07
Montana	2,201.27	6.83	2,208.10
New Mexico	69,304.72	451.42	69,756.14
Oregon	2,129.09	9.47	2,138.56
South America	416.03	.44	416.47
South Dakota	161,057.73	326.08	161,383.81
Utah	36,195.09	647.23	36,842.32
Wyoming	9,655.99	37.28	9,693.27
Total	389,584.30	2,060.13	391,644.43
MISCELLANEOUS.			
Jewelry	32,159.84	291.71	32,451.55
Uncurrent United States coin	113.31	.....	113.31
Foreign coin	1,608.37	.....	1,608.37
Redeposits	10,572.53	226.73	10,799.26
General total	12,192,565.65	30,885.40	12,223,451.05

V.

IDAHO.

By J. W. CUNNINGHAM,

Assayer in charge United States assay office at Boise, Idaho.

The value of the mineral production of Idaho for the year 1897 was as follows:

Gold	$2,125,333
Silver	7,103,321
Lead	4,501,231
Total	13,729,885

A comparison of the reports covering a period of several years shows but little variation in the production of gold in this State. Many changes, however, will be noted in the source of this product, which for a long time was confined to but one or two localities. From the original rich discoveries, which followed one after another, gold mining has spread until there is not a county in the State that does not produce some gold.

If special mention were to be made of any branch of gold mining it would be proper to note the general revival of interest in the old placer districts. In every case the first yield in these districts was very rich. The work was carried on with a view only of securing the gold that was easily accessible, and, under the conditions then existing, ground that yielded less than $10 per day to the man was not worked.

For thirty years speculation, fascinating in its plausibility, has been indulged in concerning the probable wealth that lies on the bed rock under these old claims. All manner of schemes have been proposed, until now it seems that it is practicable to reach the bed rock by the dredge system. This requires a large outlay of capital, and, like some other work where heavy investment is being made to construct ditches and flumes for working wide areas of ground on a large scale, can be best described as a substitution of modern mechanical methods for the old system of individual work, and is an application in mining of that system which in the manufacturing world has succeeded the system of the small producer.

In the old placer camp of Florence, where the first discovery of gold in Idaho occurred, several quartz mines were developed and became producers during the year. This was the banner year in the production of the silver-lead mines of the Cœur d'Alene district, and more than one-third of the total lead product of the country came from that

district. Following is the production of Idaho, by counties, for the year 1897:

PRODUCT OF GOLD AND SILVER IN IDAHO, BY COUNTIES, CALENDAR YEAR 1897.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
Ada	938	$19,391	337	$436	$19,827
Bannock	453	9,364	72	93	9,457
Blaine	557	11,514	261,654	338,300	349,814
Bingham	747	15,442	98	127	15,569
Boise	11,274	233,054	2,811	3,634	236,688
Canyon	422	8,724	51	66	8,790
Custer	5,110	105,633	226,709	293,119	398,752
Cassia	1,057	21,850	124	160	22,010
Elmore	3,018	62,388	1,275	1,649	64,037
Idaho	11,444	236,568	2,876	3,719	240,287
Lincoln	1,498	30,966	119	154	31,120
Lemhi	15,026	310,615	3,351	4,333	314,948
Owyhee	33,666	695,938	1,238,045	1,600,704	2,296,642
Oneida	822	16,992	73	94	17,086
Shoshone	16,402	339,059	3,756,212	4,856,516	5,195,575
Washington	379	7,835	168	217	8,052
Total	102,813	2,125,333	5,493,975	7,103,321	9,228,654

TOTAL PRODUCTION OF IDAHO DURING THE CALENDAR YEAR 1897.

Metals.	Quantity.	Value.
	Fine ounces.	
Gold	102,813	$2,125,333
Silver	5,493,975	7,103,321
	Pounds.	
Lead	128,606,600	4,501,231
Total value		13,729,885

GOLD AND SILVER BULLION PRODUCED IN IDAHO DEPOSITED AT GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR 1897.

Mints and assay offices.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
MINTS.					
San Francisco	2,162.044	$44,693.41	466.14	$602.68	$45,296.09
Philadelphia	160.020	3,307.91	26.12	33.77	3,341.68
Denver	148.832	3,076.63	4.94	6.38	3,083.01
ASSAY OFFICES.					
Boise	24,764.196	511,921.37	6,464.65	8,358.34	520,279.71
Helena	18,408.205	380,531.36	3,168.36	4,096.46	384,627.82
New York	1,019.159	21,067.88	157.65	203.83	21,271.71
Total	46,662.456	964,598.56	10,287.86	13,301.46	977,900.02

SOURCE OF DEPOSITS AT THE UNITED STATES ASSAY OFFICE, BOISE, IDAHO, DURING THE CALENDAR YEAR 1897.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
Ada	637.736	$13,183.17	186.61	$241.26	$13,424.43
Bannock	253.163	5,233.34	21.92	28.33	5,261.67
Blaine	207.610	4,291.69	97.97	126.67	4,418.36
Bingham	496.656	10,266.79	78.04	100.90	10,367.69
Boise	9,274.047	191,711.58	2,311.06	2,988.04	194,699.62
Canyon	221.870	4,586.46	25.87	33.46	4,619.92
Custer	360.918	7,460.84	262.61	339.54	7,800.38
Cassia	716.873	14,819.07	58.89	76.14	14,895.21
Elmore	2,368.428	48,959.76	722.44	934.06	49,893.82
Idaho	2,443.544	50,512.54	876.49	1,133.24	51,645.78
Lincoln	997.639	20,622.99	69.42	89.75	20,712.74
Lemhi	1,070.606	22,131.39	143.92	186.08	22,317.47
Owyhee	1,012.732	20,935.03	482.58	623.94	21,558.97
Oneida	721.691	14,918.68	58.58	75.74	14,994.42
Shoshone	3,702.073	76,528.63	950.07	1,228.38	77,757.01
Washington	278.611	5,759.41	118.19	152.81	5,912.22
Total	24,764.197	511,921.37	6,464.66	8,358.34	520,279.71
Deposits of—					
Montana	3,025.975	62,552.46	161.24	208.48	62,760.94
Oregon	27,723.619	573,098.07	6,582.50	8,510.71	581,608.78
Utah	195.311	4,037.43	20.05	25.92	4,063.35
Washington	43.216	893.36	6.43	8.30	901.66
Redeposits	11,745.060	242,791.94	2,423.88	3,133.92	245,925.86
Total	67,497.378	1,395,294.63	15,658.76	20,245.67	1,415,540.30

TOTAL PRODUCTION OF IDAHO DURING THE CALENDAR YEAR 1897.

Metals.	Fine ounces.	Value.
Gold:		
From quartz mines	58,807	$1,215,648
From placer mines	44,006	909,685
Total	102,813	2,125,333
Silver:		
From lead ores	4,181,530	5,406,423
From copper ores	.....	.....
Total	4,181,530	5,406,423
Grand total	4,284,343	7,531,756

VI.

MONTANA.

By EUGENE B. BRADEN,

Assayer in charge, United States assay office, Helena, Mont.

The precious-metal output of Montana during 1897 was the largest in the history of the State and aggregated $53,954,675.03. This is $3,222,576.90 more than the preceding year. The total production was contained in the four metals—gold, silver, copper, and lead. The quantities and values of each are shown for these two years in the table below:

Metals.	1896.		1897.	
	Quantity.	Value.	Quantity.	Value.
Gold ..... fine ounces..	211,914.961	$4,380,671 00	217,514.846	$4,496,430.92
Silver .....do....	15,720,022.44	a20,324,877.49	16,807,346.06	a21,730,710.03
Copper..... ..fine pounds..	232,096,483.00	25,356,540.77	237,158,540.00	26,798,915.02
Lead .....do....	22,521,340.00	670,009.87	25,794,974.00	928,619.06
Total	.....	50,732,099.13	.....	53,954,675.03

a Coinage value.

The mountains and streams of Montana have yielded $750,000,000 of precious metals to the wealth of the world since the advent of those pioneers whose arrival was almost coincident with the discovery of gold in 1862. The figures of this output as given in the following table are believed to be the most reliable that may be obtained at this date, since no reliable compilations were attempted prior to 1882:

PRODUCTION OF GOLD, SILVER, COPPER, AND LEAD, IN THE STATE OF MONTANA, FROM THE YEAR 1862 TO 1897, INCLUSIVE.

Years.	Gold.	Silver. *a*	Copper.	Lead.	Total.	Yearly increase.
						Per cent.
1862 to 1881, inclusive..	$200,000,000	$11,000,000	.....	.....	$211,000,000	.....
1882.....	2,550,000	4,370,000	$1,539,860	.....	8,459,860	.....
1883.....	1,800,000	6,000,000	3,452,960	$226,424	11,479,384	37½
1884.....	2,170,000	7,000,000	5,386,500	246,326	14,802,826	31
1885.....	3,400,000	11,500,000	6,779,800	274,350	21,954,150	50
1886.....	4,422,000	13,849,000	5,761,200	494,132	24,526,332	12
1887.....	5,978,536	17,817,548	8,853,750	607,662	33,257,496	35½
1888.....	4,200,253	15,790,736	15,103,946	569,160	35,664,095	7½
1889.....	3,500,000	19,393,939	13,334,970	456,975	36,685,884	3
1890.....	3,300,000	20,363,636	16,656,437	675,392	40,995,465	11½
1891.....	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757	*b* 5½
1892.....	2,891,386	22,432,323	19,105,464	990,035	45,419,208	18
1893.....	3,576,000	21,858,780	16,630,958	964,089	43,029,827	*b* 5
1894.....	3,651,410	16,575,458	17,233,718	730,551	38,191,137	*b* 11
1895.....	4,327,040	22,886,992	21,114,869	754,360	49,083,261	28½
1896.....	4,380,671	20,324,877	25,356,541	670,010	50,732,099	3½
1897.....	4,496,431	21,730,710	26,798,915	928,619	53,954,675	6
Total	257,533,727	273,033,393	217,487,224	9,817,112	757,871,456	.....

a Coinage value. *b* Decrease.

This table reveals a steady improvement of the mining industry in Montana. The fact that the increase of $3,000,000 last year has been frequently duplicated and even doubled during some of the past years is an absolute guaranty of permanence and future growth.

This table also ought to prove of great encouragement to those who have invested large amounts of capital in the mines of the State, as well as afford an incentive to those whose money must further improve the mineral resources and continue operations of increasing magnitude and importance.

The attention of the reader is directed to the statistical tables which follow this review and relate to the production of precious metals in Montana during the year. These show the origin, method of treatment, and the final disposition in amounts and values of the gold, silver, copper, and lead. They have been assembled from the records of the Government assay offices and mints and from confidential replies made by individuals, mining companies, smelters and refineries, to interrogatories and letters, aided by personal investigation and travel. Every care has been exercised to avoid duplications and the results are reliable and accurate.

The changes made in the geography of the State by the legislature, which convened in January, 1897, affected the production of several counties. Broadwater County was created from adjoining portions of Jefferson and Meagher counties. Additional areas were also segregated from Meagher County to be annexed to Cascade and to Lewis and Clarke counties. Thus, what of late years had been the metal-producing districts were taken from Meagher County. However, this county has not lost its prestige as a mining region. The recently constructed Montana Railroad connecting the lead carbonate camp of Castle, in Meagher County, with the Northern Pacific Railroad, was put into operation during the year and encouraged that district to a new activity. Meagher County, therefore, became the largest lead-producing county in the State.

The pursuit for gold has ever been attractive. Although pioneer and "tenderfoot" alike have loved to live this life of allurement and uncertainty, the prospector for precious metals in Montana has now the same chance to "strike it rich" or "make a stake" as was ever held out here or elsewhere. But little of the hidden wealth stored up ages ago in these mountains has been discovered, and this work, which is the forerunner of and goes hand in hand with the increased production of precious metals and the development of the mining industry in every region, was actively prosecuted in the older and most accessible districts of Montana during 1897. While generally unknown, it is nevertheless a fact, that Montana has been prospected only in a superficial way. Whole districts, aggregating an enormous area and filled with the greatest possibilities, have been unvisited by those of practical knowledge in quest of the hidden mineral deposits. It is no exagger-

ation to say that if a practiced eye, aided by a knowledge of metalliferous formations, searches among the mountains for a day it is certain to find locations that will justify work and exploration. This is as true of the old districts as it is of those but seldom visited. Discoveries of gold, silver, copper, and lead have of late years been made within and immediately adjacent to the limits of the city of Helena. The same is true of Butte and the older mining regions. The recent discovery of the many rich silver deposits at Lump Gulch, within an hour's journey of Helena, and of the Mayflower, within sight of the town of Whitehall, are examples of recent profitable prospecting in districts long worked. Great possibilities must await discovery in those less frequently visited, and still less intelligently prospected, regions of the State.

The large mining enterprises have been developed from prospects under a wise direction of capital and a judicious management. Capital has never been wanting with which to undertake development, after a practical investigation has proven the worth of any prospect.

As the surface of Montana has "been but scratched over," it is believed the present number of successful mining enterprises is insignificant to what a future generation may behold. Of the "prospects" that came into prominence as producers in 1897, the Ruby mine near Bernice, the Gold Coin mine near Cable, the Stray Horse mine at Winston, the Kennett and Monitor mines near Virginia City, the Nancy Hanks mine at Garnet, and the Keystone, Goldflint, and Snowshoe mines in Flathead County, are among the most notable. Their development and sale afforded profitable returns to their discoverers and owners.

Added to the proceeds derived from hundreds of transfers of less important prospects made during the year, these amounts aggregate hundreds of thousands of dollars and handsomely rewarded the labors of this prospecting class. The outlook for future return to these is more favorable now than in the past, because capital is looking for safe investment in these lines more than ever before.

Until recently the prospector has held exaggerated ideas of the worth of undeveloped discoveries. This has been a drawback to an increase in the number of producing properties. The present tendency is to reasonable dealing, and the period is past when prospects of undemonstrated worth will command wildly speculative prices. This willingness to deal equitably will encourage capital to undertake exploration and purchase and ultimately increase the production of precious metals.

The increase in the gold production of 1897 can not be credited to any one locality, but was made up by general activity in all of the mining districts. These districts are included in that area of the State comprising the middle and western sections, although it is in the one-third of the State directly tributary to the mountain ranges that the principal gulches and lode claims are located. The prominent pro-

ducers of gold during 1897 were the Drum Lummon, Bald Butte, Gilt Edge, Royal, Snowshoe, Ruby, Revenue, Nancy Hanks, Mayflower, Monitor, Clipper, Leiter, Gold Coin, East Pacific, H. & H., Stray Horse, and Western Mine Enterprise mines; the placers in Beaverhead, Madison, Granite, Broadwater, and Missoula counties, and the copper mines in Silver Bow County, the ores from which carry gold and silver as a "by-product." The mines and placers above referred to, as well as others of less importance, are further discussed in a review of the industry under the county where each is located.

The increase of $3,000,000 last year was a matter of congratulation to those interested, yet it does not direct the attention merited to an activity which can not be represented by figures. Those forces usually recognized as of local interest are so universal, that they become of prime importance when considered in their bearing on the present and future production of the State. Among these are the new cyanide and stamp mills, hoists, and tramways under construction, and the machinery being installed in all parts of the State. The enlarged capacity and adaptation of the East Helena smelting plant to employ electric power after the completion of the Missouri River Dam at Canyon Ferry will attract a greater tonnage of smelting product by a reduced expense for treatment. Besides the improvement promised at East Helena, consequent upon the new Missouri River Dam, the Peck concentrator, now under construction near Helena, it is claimed, will afford a method of treating low-grade ores at a minimum of cost. The recently completed smelter of the Parrot Company, of the Jefferson River, in Madison County, with its improved facilities of treating the copper ores from the Butte district, as well as all kinds of ores, and the building of the Northern Pacific from Whitehall into the Jefferson and Ruby valleys, will cause production to be undertaken at many of the low-grade ore bodies now unworked in that section. The success of the gold-dredging plants has widely directed attention to this method of working auriferous gravel. Lawsuits of long standing over mining property have been settled amicably and prospective suits compromised to permit the exploration and working of claims. An important addition to the Boston and Montana Smelter at Great Falls has been decided upon. Capitalists will build a dam over the Big Hole River to supply electric power to Butte mines and industries, and the opening of the Blackfeet Reservation to settlement will add a valuable mineral region to those now worked in the State, while the adaptation of the cyanide, bromine, chlorine, and other processes to the low-grade ores of the State is among the considerations of the future. By consolidation and reincorporation of companies and their interests the resumption of idle properties is to be undertaken. These features, viewed in connection with the development of ore bodies recently discovered, warrant the statement that there has never before been greater promise for mining in Montana than at present.

In Montana gold is obtained either from auriferous gravels of placer mines or from veins or lodes, and by one of the following methods:

(*a*) By smelting ore from the veins or lodes.

(*b*) By milling, amalgamation, and concentration, together with cyaniding of quartz ores.

(*c*) By placer hydraulic mining or dredging of gravels.

The smelting products from lodes and veins comprised those generally classed as copper, lead, and dry ores. The gold derived from this source was 107,967.374 fine ounces, or $2,231,883.72, equivalent to 49.64 per cent of the entire gold yield of the State. The gain for 1897 in this class of ore amounted to 11,146.958 fine ounces, or $230,428.11.

During 1897 there was a decrease of 6,695.044 fine ounces, or $138,398.44, in the production of mill bullion over that of the previous year. The proportion obtained by mills to the total yield of gold in the State was 35 per cent. This decrease has a partial explanation in the fact that the mills of the Montana Mining Company, Limited (Drum Lummon Mine), at Marysville, were idle until May 1, pending exploration of ore bodies in the mine. As the figures include the product from cyanide plants, there was still a small decrease beyond that explained in the shutting down of the Montana Company's mills. The output by this company from their cyanide plant during the latter part of the season in a measure also affects the decreased output from their gold mills.

The extraction of refractory gold and silver values from tailings and ores by the "cyanide process" was undertaken in Montana last year on a large scale. As the cost is small, it will be adopted widely among many of those properties in which the ores have not been susceptible of treatment by the former and more expensive methods. A general introduction of this process will acquaint men with its methods and largely increase the production of precious metals. The amounts recovered from tailings and ores by cyanide during the year were 9,993.117 fine ounces of gold and 33,937.50 fine ounces of silver. valued at $206,576.06 and $43,878.79 (coinage value), respectively.

In this process cyanide of potassium is employed in dilute solution as a solvent for the gold and silver contained in the material under treatment. The values are then precipitated preparatory to refining.

The companies employing the process or a modification of it were the Montana Mining Company, Limited, whose plant was erected near Marysville during the past year, and is one of the largest of its kind in the United States and was designed to reclaim the values contained in the tailings which had been caught during the past fourteen years in large settling dams along Silver Creek; the Revenue Gold Mining Company, on Richmond Flat, in Madison County, and the Gilt Edge Mining Company, in Fergus County, in the treatment of the ores from their respective mines, and by Morris & Field to supplement amalgamation in the Clipper Mill, at Pony, Madison County.

The output of gold from placers during 1897 was 33,418.923 fine ounces, or $690,830.43. The increase over 1896 was a small one.

The year 1896 had been a favorable one for placer mining, but the miners report 1897 to have been a "short season for water." This was due to the quick and early melting of the mountain snows and to a scarcity of spring rains. It was expected, therefore, that the figures for 1897 would show a decreased output from the placers as compared with those of the previous year. However, the introduction and successful operation of machines or dredges effected an increase and inaugurated a new era in the history of Montana placer mining. The results achieved by these dredges during the year merit more than a passing notice, as they promise to materially increase the output of placer gold in the near future. They are therefore fully described elsewhere in an article entitled "Montana methods."

Since Marshall's discovery of gold, in 1848, the profitable working of auriferous gravel has been accomplished only under the most favorable conditions, principal among which have been water and a fall in the ground attacked to permit of the disposal of the débris after sluicing. The ground included in river beds and streams, in numerous gulches where sufficient water was not available, and in large and comparatively level areas in valleys and gulches, comprise a large proportion of the auriferous deposits and have baffled all past attempts to work profitably. Many of these gravels have been thoroughly prospected and are known to contain gold in paying quantities. It is to these conditions that miner, inventor, and investor, of late years, have turned their attention in hope of finding some method to recover this gold. The present dredges have been the outcome, and while they may not be adapted to all conditions, it is believed that they may be modified to meet many of the requirements now existing. These machines handle the gravel preparatory to a washing in sluice boxes with a minimum expenditure of water. They are of two types, and are designated as floating and traction. These dredges have been successfully operated in Beaverhead, Deerlodge, and Madison counties.

The increase of more than a million ounces in the output of silver is wholly attributable to copper mining in Silver Bow County, where about two-thirds of the entire yield of silver occurs as a "by-product." By this term it is meant that the metal is not present in sufficient quantities to make mining and reduction profitable were it the sole product. The silver, as well as the gold "by-product," is of great value and is an appreciable gain in the marketable output from these mines. The increased production of these copper ores during the year, some of which carried higher values in silver to the ton, explains this increase.

Silver mining as an industry, in Montana, continues to decrease in importance. With the exception of the silver properties at Elkhorn, Castle, and Neihart, and the Hope mine, at Philipsburg, all of the famous silver producing mines of former years are idle. However,

negotiations are reported between the companies interested looking to a consolidation of the Granite Mountain and the Bi-Metallic mines, at Philipsburg, into one corporation. Owing to the low price of silver the operation of these properties under separate managements has been found unprofitable. The object, therefore, will be to minimize the cost of separate management, office hire, and superintendence, as well as milling and mining, by consolidation into one company, and thus enable a profit to be realized. If effected, this will add materially to the future yield of silver, as the ore bodies are extensive and the past production of this metal has been enormous. The resumption of these mines will be watched with eagerness by the owners of silver properties, and, if profitable, may encourage consolidation and economical management in other instances that will be beneficial to the industry.

Montana produced 237,158,540 fine pounds of copper in 1897, which is equivalent to 50.22 per cent of the entire output of 472,225,600 fine pounds by the United States last year. Copper mining is, therefore, the most important branch of the precious-metal production in Montana. Almost the entire product is from the Butte district, which has produced $383,086,779.07 in gold, silver, copper, and lead during the last fifteen years. This exceeds that of any other locality of a like area in the world during the same period.

While lead mining in Montana has been the least important branch of the mining industry, the increase made during 1897 is proportionately greater than that shown in any other. To appreciate this it is necessary to consider the closing down early in the year of the Iron Mountain mine, in Missoula County. This property was then the largest lead producer in Montana. The improvement made in the production of Meagher, Broadwater, Flathead, and Cascade counties is, therefore, greater than would appear in the comparison of aggregates for the entire State. The gold and silver occurring as a "by-product" also adds a large amount to the output of lead mines, and should be considered in an estimate of the actual advance made in this branch.

Where comparisons are made with the product of a year ago in several counties, in the review which follows the reader is reminded that in many cases the increase shown is not an actual one, but due to more general information in regard to their output having been furnished by producers. This has enabled the distribution of a larger proportion of the total output among the counties and correspondingly decreased the amount shown as "dry ores" in the table of production, by counties. When producers unanimously respond with this information every county can be credited with its actual and entire production.

BEAVERHEAD COUNTY.

This county lies in the southwestern portion of the State, and comprises that territory lying east of the Rocky Mountains and south of the Big Hole River. The principal streams are the Beaverhead and

Big Hole rivers. Among the tributaries are Grasshopper, Trapper, Horse Prairies, and other creeks. The northern portion is a rough and mountainous region centered about Lion Mountain, where are located the mines of the Hecla Consolidated Mining Company. The central and southern portions of the county are less broken, the streams are more abundant, and agriculture, stock raising, and placer mining are pursued successfully. The variation in the yield of gold and silver by this county in 1897, as compared with the output of 1896, is shown below:

Year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Value.
1896	5,928.183	$122,546.42	365,541.70	$472,619.58
1897	12,383.324	255,986.03	216,673.67	280,143.73

The increase in gold was due to a renewed working of the placers at Bannack, while the decreased silver production is wholly explained by the lessened operations of the Hecla Company on account of the exhaustion of the ore bodies at their mines.

The Hecla Consolidated Mining and Smelting Company own a number of claims on Lion Mountain in which considerable development and much mining has been done. The ore extracted was supplied to their reduction works. The operations in 1897 were confined principally to the Cleve and Atlantic mines. At the former about 35 men were employed. This mine was worked through a shaft 1,425 feet deep at an angle of 20 degrees. A force of some 65 men was employed at the Atlantic. This mine is worked through a tunnel 3,200 feet long and a 1,000-foot incline. Both mines are equipped with engines and hoisting apparatus.

The reduction works of the Hecla Company are at Glendale, about 9 miles east from its mines, on Lion Mountain. The yield of this company during 1897, which has been made public by General Manager Knippenberg in his annual report, was 405 ounces of gold, 215,431 ounces of silver, 184,836 pounds of copper, and 1,990,175 pounds of lead. During these twelve months dividends aggregating $30,000 were paid from the surplus. The running expenses exceeded the earnings by $39,438.50, and represent the loss for the year. These two items of outlay have reduced the large surplus usually carried by this company, so that but a small amount remains and renders the continued operation of this famous property largely problematical. The present situation is concisely set forth by Mr. Knippenberg in his report, as follows:

I do not say that there are no more ore bodies in Lion Mountain. It is my opinion that we have not reached the end. The mountain may yet contain more wealth than we have out, but the financial risk to be incurred in finding such hidden ore bodies may be greater than we are justified in assuming in our present condition. Had we a large surplus, as in former years, I should do now just as I have done

under similar circumstances in years past—push on. * * * There is only one course for me to pursue. So long as we can pay expenses from the monthly earnings I am willing to push on in development and present work, but I can not consent to incurring an indebtedness.

The life of this company furnishes an example of the success and profit which come from legitimate mining and from which many another concern might pattern advantageously. The ore has been comparatively low grade and carried gold, silver, copper, and lead. On the capital stock of $1,500,000 dividends amounting to $2,175,000 have been paid since organization. The large force of men employed in the operation of its mines, reduction works, and concentrators for more than twenty years past has been of substantial benefit to the community. Since 1881 $7,251,563 has been paid for labor alone. It thus may be seen that the total outlay for machinery, mining properties, transportation, fuel, supplies, and other contingent expenses, in addition to the item of labor, has reached far into the millions. The number of these properties, alike profitable to both owner and community, has been steadily growing in the State, and this fact is rapidly taking the mining industry from the field of speculation, to which it has so often been referred, and places it before the world as entitled to all confidence and cooperation given to the best business enterprises.

Too much praise can not be bestowed in this connection upon the management that has characterized this property. It shows conclusively that where mines are handled on a business basis they can be made a success or rejected as valueless at an early state of operations. This is gratifying in that the increasing annoyance and outlay of large sums are saved to the investor through a long period of uncertainty as to a property's merit, which in the end would result in great disaster. Sincere regret is widely expressed at the possible closing down of this well-known property and works and the removal of a well-known producer with a record of many years from the industry in Montana.

The first production of gold in Montana on a large scale was in 1862, from the bars lying along Grasshopper Creek, in the central portion of this county, both above and below the town of Bannack, and amounted to not less than $600,000. This stimulated the pioneers to prospect the territory now comprised within the boundaries of Montana and resulted in the discovery of the millions of treasure in Alder, Last Chance, and Confederate gulches and the opening of many lesser "diggings" that have since added their output to the enormous total of gold and silver.

By hydraulicking and other methods then prevailing, the rich bars of Grasshopper Creek and tributary gulches were exhausted in a few years, and the passing of the first capital and metropolis of Montana was accomplished. Aside from the development of the neighboring quartz leads, Bannack for many years suffered an ominous silence and oppressive sense of desertion. The low-lying level areas adjacent to and included in the bed of Grasshopper Creek baffled the old-timers and their methods, so that they necessarily left the richest ground

unworked. It was in 1895 that a new era dawned, and work was resumed by means of a dredge upon these abandoned portions of Grasshopper Creek.

The first operations were unprofitable, but by the rebuilding and additions made during the summer of 1896 a plant was finally obtained that effected a profitable recovery of gold from the creek bed and low-lying gravels. This first plant was the property of the Gold Dredging Company of Chicago, and was operated under the management of H. J. Reiling. Encouraged by their success, a second corporation, known as the Bannack Dredge Company, was formed by members of the former company and others. This company secured ground and erected a second plant at the beginning of the 1897 season. The Chicago Mining and Development Company, who had some time previously installed a suction dredge to work their ground, remodeled the same to a bucket dredge, similar to that of the Gold Dredging Company, and, late in 1897, the Bon Accord Mines, Limited, an English corporation, installed a plant further improved on their ground some 3 miles below Bannack.

This latter dredge has not yet been in operation, as the season was closed before its installation. To these plants the increase of more than 100 per cent in the 1897 gold output of Beaverhead County is attributable. The season of 1898 will undoubtedly be characterized by greater activity and increased production.

Besides those already installed, capital is said to have been secured for the erection and maintenance of additional dredging machines near Bannack and at the placers on Horse Prairie Creek, near Amesville, in this county, some 32 miles southwest from Bannack, where the Yearian Brothers profitably prosecuted placer mining some twenty years ago.

The Western Mine Enterprise Company, who own a mill and quartz claims at Bannack, made a considerable output during the year. Their operations have been carried on largely in connection with leasers, who have gone into the mine and gathered the small bunches of ore, as well as opened new deposits on a royalty. Owing to the economy practiced by these leasers, they are able to secure good returns for their labor, and largely do away with the necessary large outlay and risk to owners attendant upon the direct operation of a mine. It is a method of mining that is becoming more and more popular in Montana.

The Blue Wing mining district, situated several miles east of Bannack, after lying dormant for some years, took on new life during the past season, and considerable prospecting for quartz lodes was done, with very encouraging results. The Departure mine, a steady producer, is the leading property in this region. It is owned and operated by Lawrence A. Brown. The development is by three tunnels aggregating 1,870 feet. Some ten men are employed. The character of the ore is silver.

At the old camp of Argenta some activity has been shown, although

the ores both here and elsewhere in Beaverhead County carry values largely in silver, and the low price of this metal for some time has precluded the working of ores that would have been profitable in former years. A concentrator and leaching mill have, however, been in operation by Townsend & Butler at this place. The placer ground above Argenta was also worked during the year.

The production in the other districts of the county was small and scattering, although there is promise that the Polasis mill may resume handling custom ores. With a low rate of treatment afforded by such a mill the small mine owners in the Lost Cloud mining district may become producers and, in the aggregate, add considerable to the yield in Beaverhead County.

BROADWATER COUNTY.

The State legislature, which assembled in January, organized this county from portions of Meagher and Jefferson counties. As constituted, it embraces that portion of the Missouri River Valley lying west of the Big Belt Mountains. The Northern Pacific Railroad traverses it from southeast to northwest, while the important mining regions are those tributary to the towns of Winston, Townsend, Radersburg, Hassel, and Diamond City. These districts in 1897 produced 11,344.357 fine ounces of gold; 409,567.84 fine ounces of silver; and 1,848,111 pounds of lead. The total value of these products was $936,784.48.

The most extensive pursuit of mining in the county at present is in the Crow Mountains between Winston and Hassel. Winston has been built but a few years, and owes its growth to the rapid development of the mineral resources tributary to it. This district promises to become shortly one of the best known and most important mineral districts in Montana.

The East Pacific mine is about 5 miles from Winston, and was the earliest producer that attracted attention to this district. It had been thought that the ore bodies in this mine were exhausted, and mining was suspended. Mr. R. A. Bell, of Helena, then bought the property at a moderate price. His search for ore was successful, and last year the East Pacific had grown to be the second largest producer in the State east of the main range of the Rocky Mountains. This property is giving employment to a force of 60 miners, besides teamsters and others. The product is a base ore, carrying gold, silver, and lead, which is shipped to lead smelters for reduction. The two working tunnels at this mine are 1,800 feet and 2,700 feet in length, respectively.

The Stray Horse mine is another Winston producer, although it made its advent as such only a few months ago. It was purchased by the Ajax Mining Company, a corporation of Helena capitalists, from the Connon Brothers, for $85,000. The company has been successful in its venture and a long period of successful mining is probable. An operating tunnel, to reach the vein at the depth of 500 feet, is being run, which will greatly facilitate the development and extraction of ore.

The ore in the Stray Horse is characteristic of that in the Winston district, and carries the values in gold, silver, and lead. It is reported that this company will erect a concentrator.

The Harris and Hazleton mine, generally known as the "H. & H.," is located at Winston, and has been producing for a number of years. It is now owned by the Custer Mining Syndicate. Last year the mine was worked by leasers, who confined their operations to the surface deposits. These are numerous and of good paying quality. The ores are oxide and sulphide, and carry gold, silver, and lead. Frequent shipments were made to lead-smelting plants.

Besides these three mines, the district has many properties in different stages of development and production, which insure steady growth and progress.

Townsend, the county seat, is located at the crossing on the Northern Pacific Railroad and the Missouri River. It is the gateway to the Hassel and Park districts, as well as to Meagher County, in which it was located before Broadwater County was created. Immediately opposite to the town and west of the river are the old placers, along Indian Creek and in the tributary gulches. These have produced largely in the past, although of late years their yield has been comparatively small. A company of Townsend and Helena men has been incorporated to operate a dredge on this creek and adjacent gulches. A scarcity of water has been the drawback to washing this gravel, which carries profitable values in gold.

The Hassel district lies 8 miles southwest of Townsend, at the head of Indian Creek, and the Park district is some distance beyond and farther up the mountain. Both of these have been actively prospected in the past year and promising strikes are reported. Considerable machinery has also been taken into this section. The mines have produced considerable smelting ore that was hauled to Townsend for rail shipment. The ores of the district carry silver. The low price for this metal necessitated only a small production.

The Diamond Hill Mine, now owned by Scottish capitalists, is located near Hassel. The large mill at the mine and the electric-power plant and dam on Crown Creek were completed during the year.

The Diamond Hill Mine is a large low-grade proposition, mined at a small cost per ton. If the cost of milling on a large scale can be secured for a correspondingly low rate, it is probable that a handsome revenue will yet be returned to the owners. The 120-stamp mill and the 48 vanners were designed to be run by electric power generated by the plant on Crow Creek. A test of this plant when completed proved the water power to be insufficient. As the cost of fuel would overcome the small margin in the ore, steam power is unprofitable. It is said negotiations are pending to secure current from the Missouri River electric plant at Canyon Ferry, as an alternative for the Crow Creek power plant. The future of the Diamond Hill is of great importance to

mining in that it will determine the success of modern mechanical appliances in mining, handling, and treating large quantities of low-grade ores at a minimum cost and yield a reasonable return on the investment. The future of this property is watched with interest and its success widely desired.

Radersburg is one of the older towns in the State and considerable mining in both quartz and placer was formerly done here, the Blacker and Keating mines having been large producers, and both are preparing to resume operations. Near Radèrsburg is also located the North Home mine. This is a large deposit of "horn silver" ore (chlorite) that has been worked but little, owing to the incompatibility of the owners and a weak silver market.

Diamond City is also an old town and was the early placer camp located in the famous Confederate Gulch, which yielded so enormously in years gone by. Its situation is in the northern portion of the county. Authoritative estimates place the gold taken from this gulch at $19,000,000. Placer mining is still followed in a small way by miners working along the bars, but their output is inconsiderable at present.

A large number are employed in prospecting and small mining operations in all sections of Broadwater County.

CARBON COUNTY.

This division of Montana lies along the southern boundary of the State, west of the Crow Indian Reservation and south of the Yellowstone and Stillwater rivers. The county seat is Red Lodge, and is reached by a branch of the Northern Pacific from Billings. The principal industry is coal mining. Gold is found in small quantities, along Clarks Fork and other streams, near Red Lodge. The yield last year was 111.336 fine ounces, or $2,301.52. The western portion of the county is broken by exceedingly high mountains, from which valuable finds of mineral have been reported. A dredging plant is reported to be in procress of erection on Clarks Fork, whereby greater values may be secured than heretofore.

CASCADE COUNTY.

The mineral-producing district of this county is the southeastern part, which lies north and east of the Little Belt Mountains and which was segregated from Meagher County a year ago. Cascade County also occupies the territory surrounding the confluence of the Missouri and Sun rivers.

The county seat is Great Falls, situated on the east side of the Missouri River above Great Falls, from which the town takes its name. Here is located the large copper smelter and refinery of the Boston and Montana Consolidated Copper and Silver Mining Company. Power is obtained from the rapids known as the Black Eagle Falls. These

works are very extensive and were built at this place to secure the cheap power in the treatment of ores from the company's mines at Butte.

The Montana Central Railroad, 178 miles long, was built in 1887 across the Rocky Mountains and two other ranges, to connect Butte and Great Falls. These falls, which could generate a power estimated as the largest in the United States, have already been of great benefit in the development of the State. It has been found that a sufficient saving is effected in the cost of treatment and refining to warrant the hauling of the ore between the terminals of the Montana Central and utilize this water power. Trains of enormous tonnage daily arrive at the smelter from Butte. These return with coal from the mines at Belt and Sand Coulee, which are the largest coal mines in the State, and are also in Cascade County. The Montana Central, the Boston and Montana Smelter, and the Great Falls thus constitute an interesting feature of the copper-mining industry.

The precious-metal production of this county originates in the mines near Neihart and Barker. The output of Cascade County was as follows: Gold, 490.046 fine ounces; silver, 385,844.69 fine ounces; lead, 1,338,836 pounds, or a total of $557,198.15.

The mining camp of Neihart showed unusual activity during 1897. Here are located the Broadwater, Diamond R., Florence, Big Seven, Queen, Benton Group, and Bernier and Gann mines, besides others in less advanced stages of development and production. The largest as well as the best-known property at this point is the Broadwater Mine, whose ores carry silver and a small percentage of lead. It is owned by John S. Searles, of New York City. The product is treated at the Silver Smelter, below Great Falls, owned by the United Smelting and Refining Company. This company took a lease of the Broadwater Mine during the year and are operating the same. The tonnage from this property was enormous last year and its operation afforded employment to a large force.

The Florence, Big Seven, Diamond R., Benton Group, Bernier and Gann, and Queen mines were also active. The product from all, like that of the Broadwater, carried the principal values in the silver contents. Besides this, lead is present in a small quantity, and in the case of the Big Seven the gold contained was a considerable item.

At Barker, the largest yield last year came from the Wright & Edwards mine, where some twenty-five men were employed. The property is now leased by the United Smelting & Refining Company and operated in connection with their smelter below Great Falls. Work on the Tiger and other claims is being done by the leasers, while considerable activity is elsewhere displayed about the district.

CHOTEAU AND TETON COUNTIES.

The output of gold from these counties originates in the placers near Gold Butte, one of the Sweet Grass Hills. This district is located in the two counties near the international boundary.

DEER LODGE COUNTY.

The area embraced in this county lies about halfway between the northern and southern boundaries of the State, immediately west of the main range of the Rocky Mountains. The region is very rich in mineral, the output of precious metals last year being 18,143.307 fine ounces of gold, valued at $375,055.44, and 9,111.45 fine ounces of silver, or $11,780.46. The northern portion of this county is mountainous and broken, the drainage being by the Big Blackfoot and Flathead rivers and their tributaries. This region has been but slightly prospected, although some valuable discoveries have been made. The central and southern divisions of the county, at present, are more accessible, and mining, smelting, agriculture, lumber, and stock growing alternate with each other in giving to this section a diversity of pursuits that guarantees large wealth and prosperity.

The leading producer in the central part of Deer Lodge County is the Bald Butte mine. It is owned and operated by the Bald Butte Mining Company, and lies almost at the summit of the main range. This mine has paid dividends for six years, and the exploration completed during the year assures the present yield for many years. The mine is operated through the two tunnels known as No. 1 and No. 2. These are 1,500 feet and 1,700 feet in length, respectively. The ore is free milling and treated at the 60-stamp mill owned by this company, some three-quarters of a mile below the mine. All values that escape successful amalgamation on the plates are secured by a subsequent concentration of the battery pulp on Frue vanners. The tailings are then discharged into a settling dam below the mill.

The Bald Butte Stamp Mill is the best appointed in the State. Light, airy, and clean are terms that describe one's first impression of the plant, and inspection inspires the feeling that economical operation is also achieved here in the fullest possible degree. From the delivery of the ore to the mill by wagon until it leaves as tailings, the passing of it through bin, feeder, mortar, and concentrators is performed by gravity, and reduces the cost of labor for milling to a minimum. An electric plant is located at this mill which furnishes lights to the mill and mine and power to a crusher at the mine, the ore being broken before hauling to the mill.

Another property in this county, near the summit of the main range and some 10 miles northwest of the Bald Butte, is the Prize mine, which has been purchased recently by Eastern capitalists. The vein has been explored by a 500-foot shaft, and the ore is prospected in a 10-stamp mill. The owners entertain great hopes for this property. The lead is a strong, regular, and well-defined fissure vein, and the product is free milling gold ore.

The Ontario mine is a Deer Lodge County property, somewhat involved in debt by early mismanagement. For this reason, little has been done recently with the property. The equipment includes a 200 ton concentrator and hoisting plant. Should the present obstacles t

removed, it is said that a large force could be employed in extracting ore that would prove profitable.

Washington Gulch, 12 miles north of Avon, is a tributary of the Big Blackfoot. At this point W. M. Johnson & Co., a Chicago syndicate, have erected and operate a land mining machine, which they call a "traction dredge." The machine proved very successful during the last season and attracted much favorable comment, because of its simplicity and strength. This machine will closely crowd the floating dredges operated along the Grasshopper Creek in Beaverhead County, for general adaptability and usefulness in working gravels heretofore beyond the scope of placer mining.

The auriferous deposits of the Big Blackfoot at Lincoln yielded large values during the earlier years of mining in the State. Washing of placer gold is still pursued in an unimportant manner, and the annual yield from this locality and from other points along the Big Blackfoot is considerable. Another important placer camp in early years, not far from Washington Gulch, was at Blackfoot City. This is now called Ophir. Considerable activity is still displayed here, and improvements, consisting of new flumes and ditches, have been built during the year, preparatory to enlarged operations. The yield of this gulch is closely approximated to have been $7,000,000.

On Nevada Creek, near Helmville, Messrs. Raleigh and Clark have placer ground, which is worked regularly and yields considerable gold.

Coloma is situated on Elk Mountain in the Bear Mountain Range. The Granite County line is distant less than a mile to the south, and the Missoula County line is some 2 miles westward. Large quantities of gold were taken from placer mines in this neighborhood during the palmy days. Subsequently to this, as the yield became scarcer, the miners turned their attention to prospecting for the quartz lodes that had supplied the rich deposits to the gulches, but without success until about 1885, when activity again came to Washoe and Bear gulches, and a number of mining claims were secured that have since proved valuable. The Mammoth mine was the principal discovery, and came into the possession of the Mammoth Gold Mining Company in 1890, who have since operated the property. The property now includes a 10-stamp and cyanide mill in Washoe Gulch, where the ore is treated. Some 50 miners are regularly employed.

Promising locations in Deer Lodge County, near Coloma, include the I. X. L., adjoining the Mammoth, the Valley, Clemantha, Rose Darling, and others.

Gold was first discovered in Montana at the town of Pioneer, on Gold Creek, near the Granite County line. The placer ground at this point has been worked steadily ever since and still yields large sums. The output from this vicinity last year was over $20,000, and the total yield to date has been about $4,000,000.

Cable is located in the southwestern corner of Deer Lodge County and takes its name from the Cable mine, which has passed into history

as having produced the richest quartz ever mined in Montana. A famous "clean-up" amounted to $75,000 after a run of 10 stamps for something over twenty-four hours. At that time it is said that the battery coppers became so loaded with amalgam that the stamps were choked and finally could not be dropped successfully.

The largest producing mine near Cable at present is the Gold Coin mine. The property is equipped with a 30-stamp mill. The product has the distinction of being of the highest gold fineness and purity of any taken from quartz in Montana. Although a recently opened mine, the output has grown to be considerable.

The Southern Cross mill, at Cable, is under lease to parties who make a specialty of treating base ores and tailings that are not susceptible of successful amalgamation and concentration. In this the cyanide process is employed in a form modified to meet the existing requirements of the ore.

The city of Anaconda is the county seat of Deer Lodge County and has a population of 12,000. It is one of the largest and most important places in the State. The copper smelting works of the Anaconda Company are located here. These are the largest of the kind not only in the United States but in the world. They are 28 miles from the mines of the company at Butte. The ore is carried to the smelters by the Butte, Anaconda and Pacific Railroad, a property in which the Anaconda Company own a controlling interest, the line having been built by them several years ago to transport this ore.

The plant at Anaconda consists of the upper works, the lower works, converters, electrolytic refinery, foundry, and brickyards.

Three thousand men are employed, and the monthly pay roll is $250,000.

No expense has been spared in equipping the works throughout with the most approved machinery and methods. The smelters were founded in 1883, and represent an investment of over $10,000,000. Nearly 300 carloads of ore are handled daily. To do this hundreds of tons of coal, coke, and other fuel are consumed. It is impossible to describe in detail this great plant and its vast business in the limits of this review, yet it stands as a most eloquent monument to the mining industry in this State, built as it has been in fifteen years and simply to treat the ores of a single company. No better index to the possibilities of Montana mines can be pointed to than this. It is a project well entitled to a place among the wonders of the world.

FERGUS COUNTY.

The large area lying between the Missouri and Musselshell rivers is known as Fergus County, and is devoted principally to stock raising and agriculture. In 1897 the product of gold and silver was 3,148.559 fine ounces and 237.36 fine ounces, respectively, and together worth $65,393.38. *The mining districts* in this county are in the Judith, Moccasin, and Belt mountains. The former two ranges are situated near

the center of the county and about 10 miles from each other. The formation is similar, and consists of lime, granite, gneiss, porphyry, slate, quartzite, and shale. The leads are contact veins. Blanket leads also exist. The principal producing properties and gulches are near the towns of Maiden and Gilt Edge.

The Spotted Horse mine, at Maiden, is in a lime formation, and in the past has produced about $1,500,000 of gold. The career of this property has been one of ups and downs, and will ever form an interesting chapter in the history of Montana mines. It is developed and worked through a double-compartment shaft nearly 400 feet deep. A hoist and a stamp mill constitute the equipment. Recently the management of the property has been changed, new machinery secured, and an effort is to be made to place the mine again on the list of large producers.

The Gilt Edge mine is another property that has attracted wide attention. It is about 4 miles east of the Spotted Horse and is worked through tunnels and cuts. A large amount of low-grade ore is in sight. A mile below the mine is the cyanide mill, with a daily capacity of 60 tons. Mismanagement in the past has gotten the property into financial entanglements, from which it is being released as rapidly as possible. Its growth has been seriously retarded on this account. The ore is an ideal one for treatment by the cyanide process, and under the management of the receiver for the property, L. S. Woodbury, large returns have been derived in the past year and the mine has proven to be a veritable bonanza. A reorganization of the company is to be effected and work resumed on an increased scale. The ore, when worked in large quantities under careful management, will yield a good revenue.

Other properties in this section are those of the Maginnis Mining Company and the New Year and American Flag groups. The former was a considerable producer for many years, but as the ores became base with depth the mine was finally abandoned. The latter two are under bond. The New Year group is about 3 miles from the Spotted Horse, while the ore is of the same character as that at the Gilt Edge and worked by the same process. These groups are promising prospects and merit the attention and development now being given to them.

Placer mining is followed in a small way among the Judith, Moccasin, and Little Belt mountains. The yield of this gold in Fergus County during 1897 was about $1,000. Rubies and sapphires are found along Yogo Creek, in the southwestern part of the county. The quality of the gems is excellent, and as the demand for them is a growing one, the yield will achieve greater importance.

FLATHEAD COUNTY.

Lying west of the Rocky Mountains and north of Flathead Lake and the Cabinet Mountains is Flathead County. To the north and west are *Canada and Idaho,* respectively. Although the placers of Libby Creek *are as old as the history* of mining in Montana, the development of the

resources of this county can not be said to have been undertaken until after the building of the Pacific extension of the Great Northern Railroad across the county in 1891, which afforded communication and railroad facilities to this region. The growth of its mineral and other resources has since been progressive, and in 1897 was as marked as that of any section of the Northwest. The discoveries under exploration at present and the mines now worked indicate that Flathead County will achieve an importance in mining in Montana rivaled only by Silver Bow County. Enough is known to warrant the statement that gold, silver, copper, and lead are all in the list of future products and in sufficient quantities to secure the needed capital for development and operation.

The Snowshoe mine is situated in the Cabinet Mountains, 18 miles south of Libby. It is owned by Spokane parties. The showing made is a flattering one. Tunnels of 750 feet and 230 feet have been driven on the vein and expose a large volume of ore. The ore is an iron pyrites and galena carrying gold, silver, and lead, and is concentrated at the mine. The product is then shipped to a lead smelter for treatment and reduction.

The Keystone mine is on the Yahk River at Sylvanite, in the extreme northwestern portion of the county and State. It is developed by a tunnel 200 feet in length. The ore, which carries gold, silver, and lead, is treated in a 10-stamp combination mill operated by water power, about 1½ miles from the mine.

The Goldflint mine is another property at Sylvanite. A tunnel of some 400 feet has been run to develop and work the mine. Gold, silver, and lead are the values recovered from the ore. A 20-stamp combination mill will soon be completed.

The Silver Cable mine is a property in the Cabinet range, about 25 miles south of Libby. Considerable development has been done here, and the quartz yields values in gold, silver, and lead. A 3,000-foot tramway connects the mine with a 50-ton concentrator and transports the ore for treatment. Both tramway and concentrator were built in 1897.

To the east of the Kootenai River and immediately south of the International boundary is the Tobacco Plains country. The Independence mine, 8 miles from the river, gives promise as a copper producer. The exploration at this mine aggregates 1,000 feet, and shows a strong lead of chalcopyrites of copper. The present development will justify the erection of a concentrator at the mine.

The B & B, the Big Eight, the Julietta, the Yankee Girl, and other properties are receiving attention and promise much at the present development.

GRANITE COUNTY.

Granite County lies between Deer Lodge County on the east and Ravalli County on the west. The main line of the Northern Pacific crosses the county from east to west, nearly parallel with the northern

boundary. A branch line also extends from Drummond to Phillipsburg, the county seat. The county is exceedingly mountainous and rich in precious metals. The yield of gold and silver last year amounted to $770,924.68.

Placer mining is carried on profitably in a number of localities. The yield in 1897 was slightly in excess of $30,000.

The silver mines centered about Phillipsburg have become famous for their enormous production in the past. This has amounted to many millions of fine ounces. The leading property was the Granite Mountain, which paid over $12,000,000 in dividends, while the Bi-Metallic, Hope, Trout, and many others have been worked successfully and yielded large returns to their owners. The decline of the price of silver brought about a closing down at the several mines. After having been idle some years, the Granite Mountain and the Bi-Metallic are soon to resume work. This will be a welcome feature of the coming year to all interested in mining in this section of the State. A consolidation has been effected of the companies owning these mines and mills, and under a single management it is believed that enough of a margin can be realized from working the large bodies of low-grade ore in sight to yield a profit.

Some distance northwest of Phillipsburg is the Combination mine. This is exclusively a silver producer, and has yielded steadily for a number of years in spite of the low price of silver. The ore is of a higher grade than that from the mines near Phillipsburg. It is to this fact that the profitable working without stopping is generally attributed, while larger properties were idle.

The camp of Garnet came into prominence during 1897 because of a number of rich discoveries. It is in the extreme northern part of the county and about 12 miles from the railroad station of Bearmouth. The veins are copper and gold bearing, and lie in a contact between the lime and granite. A great deal of work is done by leasers.

The Nancy Hanks, the largest producer in the camp since rich ore was struck last summer, has made a good record and netted a large profit to the owners. In carload lots the ore runs 5 ounces of gold to the ton and 4 per cent of copper. Other mines, among these the Shamrock, adjoining the Nancy Hanks, the International, the Red Cloud, and the Tuskman, have been working successfully. As development is prosecuted the ore bodies are found to increase in size and depth, and this brightens the future of the district. As the original rich discovery was made only last summer, the country is but little prospected, and valuable discoveries probably await those who undertake a practical search.

The Moose Lake district, lying about 30 miles southwest of Phillipsburg, is another region of Granite County that sprung into prominence for the first time in 1897. The outcome from the small plants installed to test the ores is awaited with interest.

The Golden Scepter Company, who operated at Quigley, has been reorganized and reincorporated as the Majestic Mining Company. After a heavy investment in mine and mill by the first company, the property became involved in debt and was sold at forced sale before being worked. A considerable outlay will be made by the new company to make the improvement necessary to commence work during the coming season on a large scale.

JEFFERSON COUNTY.

Jefferson County is situated near the center of the western half of Montana. The region is rich in mineral and the surface is much broken by mountains. Mining is the principal industry, and the yield of precious metals by this county in 1897 was the second largest in the State. The value of the total output was $1,161,438.88. In detail, the values were: Gold, $162,872.02; silver, $984,230.32; copper, $1,160, and lead, $13,176.54.

The largest producer in the county is the Elkhorn mine, at Elkhorn. Strictly speaking, this property is a silver proposition, although the ore carries both gold and lead. It is owned and operated by the New Elkhorn Mining Company, under the management of Walter S. Kelley. Some two or three years ago it was given out by the company that they were about to abandon this property, and for a time development work was stopped. However, under careful supervision, it is still in active operation, although the future is problematical, and it may ere long pass into history as one of the famous mines in the State at this period.

Outside of the Elkhorn every prominent producer of past years, in Jefferson County, was idle in 1897. In this list may be included the Alta, Hope, Katie, Golden Sunlight Group, Eva May, the silver mines of Lump Gulch, and others. The sale and reorganization contemplated of the Hope Mine, the rebuilding of the concentrator and erection of a smelting plant at the Katie are projects destined to redeem these unfortunate properties from the idleness of the past year and increase the output of this county.

The Ruby mine, at Bernice, became the property of the Gold Mountain Mining Company during the year, and the heavy extraction of ore for a few months has already proven this to be a rich producer of both gold and silver. A concentrating plant has been erected, and the product is sent to a smelter for final treatment.

The Overland mine and mill, near Montana City, were active during the year. The Bonanza Chief is another property in this vicinity that was worked profitably. The number of small producers in all parts of the county made up a considerable product. At Montana City a dredging machine was in operation on the placers at this place, but, owing to an imperfect method of work, the recovery was small. A new plant is to be installed in the hopes of saving the gold.

LEWIS AND CLARKE COUNTY.

Lewis and Clarke County embraces the portion of Montana that lies immediately east of the main range of the Rocky Mountains. On the east is the Missouri River and on the north is the Sun River. The production of gold and silver in 1896 and 1897 was as follows:

Metal.	1896.		1897.	
	Fine ounces.	Value.	Fine ounces.	Value.
Gold	29,217.614	$603,981.68	31,762.517	$656,589.49
Silver	146,170.87	188,988.59	131,077.04	169,473.34
Total	.....	792,970.27	.....	826,062.83

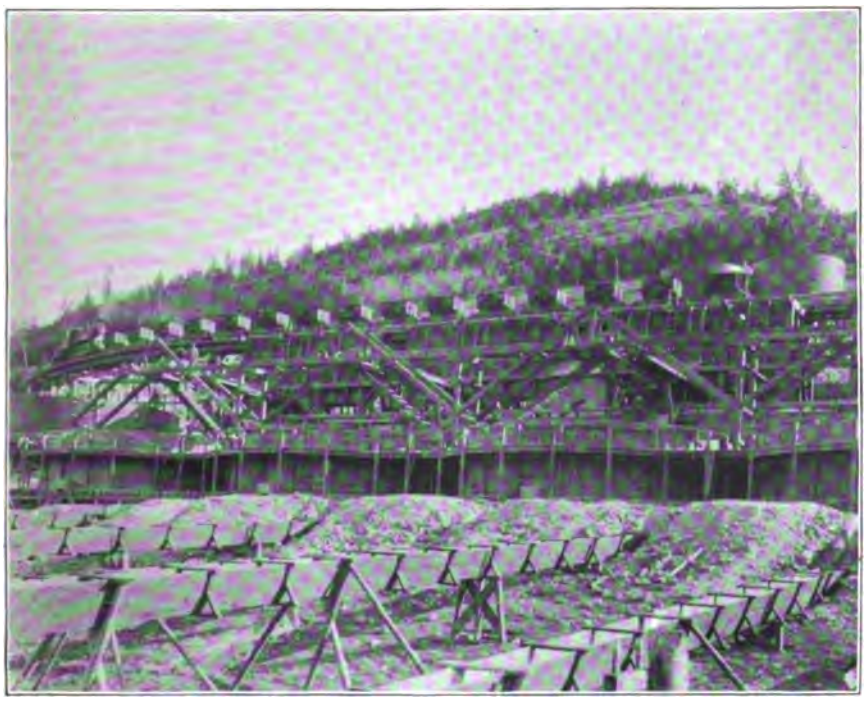
The increase of $33,092.56 is a very creditable one, as the mills of the Montana Mining Company, at Marysville, were idle until May 1.

The largest property in the county is that of the Montana Mining Company, Limited, at Marysville. This is also the most important gold mine in the State. The development consists of about 8 miles of tunnels and entrances at the various levels. A depth of 1,600 feet has been reached by the present workings. The equipment at the mine comprises a 60-stamp mill and Frue vanners, a 50-stamp mill with pans and settlers, a 100-drill air compressor and drills, 3 hoisting engines and hoists, pumps, and machine, blacksmith, and carpenter shops. The ore is free-milling, and the mining, milling, and development affords employment to about 250 men.

During the summer of 1897 the Montana Company erected a 400-ton cyanide plant in Silver Gulch, about 3 miles below Marysville, to work the tailings from their mills that had been recovered in settling dams. The tailings treated in 1897 were from the lowest of the five dams in Silver Gulch. This is about 6 miles below Marysville and about 2½ miles below the cyanide plant. A narrow-gauge railroad was built to connect the two. These tailings are prepared uniformly for treatment at the dam by plowing, harrowing, and continuous working to pulverize the slime lumps. The material is then loaded into cars of 3 tons capacity each and then delivered to the mill. As this mill is the largest working by the cyanide process, a brief description follows:

The tailings, after leaving the cars, pass in an almost continual stream to the sheet-iron lining of the bins and out of the gates to a 24-inch 4-ply belt conveyor, which conducts them to a revolving chute or distributer; and this, in turn, fills a vat, 38 feet in diameter by 9 feet deep, with 400 tons of tailings in about eight hours. The great advantage of filling a tank in this way is that it gives a charge of more uniform permeability than any other method.

There are four of these tailings vats, each with its bin, conveyor, and distributer, and one is charged daily, thus giving four days to complete the treatment of each charge, which consists in saturation, lixiviation, washing, and discharging. The latter is accomplished by sluicing with



CYANIDE PLANT OF THE MONTANA MINING COMPANY (LIMITED), MARYSVILLE, MONTANA.

About 4 miles south of the city of Helena is Unionville district, which yielded several millions of dollars in gold and silver previous to 1880. The Whitlach-Union is the most celebrated of these old properties. In this district, and supposedly on the same vein, are located other properties, on which but little development work has been done.

Five miles west of the city of Helena is the Blue Cloud mining district, where Thomas Cruse is reported to have a large property. In the vicinity of York, on Trout Creek, are the Little Dandy and other mines. Most of these have been idle during the year, although negotiations are pending to enable them to be developed and worked. The properties of the Jay Gould and Tremont companies, at the head of Virginia Creek, have been idle throughout the year. These were formerly celebrated camps, from which a great deal of gold has been taken.

It is from the placers that the greatest profit from mining has been realized in this county. The city of Helena is built in the famous Last Chance Gulch, from which fully $33,000,000 in gold have been taken since its discovery in 1864. Immediately adjacent and south of Helena are Dry Gulch and Oro Fino Gulch, from both of which heavy values have been washed. Considerable gold is still secured from these localities by miners working independently. Gold is also produced from the bars along the Missouri River and tributaries, especially those in that portion that was formerly Meagher County and lying east of the river. Other "diggings" in the county producing gold ore are those of Canyon Creek, Virginia Creek, and Seven Mile.

MADISON COUNTY.

Lying between Beaverhead on the west and Gallatin on the east is the county of Madison. To the south is the State of Idaho. Important mountain ranges traverse this large area from north to south.

These include the Madison, Tobacco Root, Snow Crest, and Ruby ranges in the south, and the South Boulder and McCarty mountains in the north.

The drainage is by the Madison, Jefferson, Beaverhead, and Ruby rivers and tributaries. The territory embraced in the county is a large one, where mining is most exclusively carried on in the mountains, while in the valleys agriculture and stock raising prosper and are excelled nowhere else in the State. Although Madison County was the first to be explored, and its hills contain a wealth of gold and silver second to none, the development of its discoveries has been comparatively small. This has been brought about by the utter lack of transportation facilities as well as smelting and other convenient means of treating the low-grade base ores. During the past year the Northern Pacific Railway has undertaken the building of a branch line from Whitehall into the Jefferson and Ruby valleys, upon which work will soon be completed. This valuable facility has its complement in the new *Parrot smelter*, which has been built at a cost of nearly three-fourths

of a million dollars, and is to commence operations in a short time at Parrot (formerly Gaylord).

This surmounting of these past wants will incite greater activity and rapidly urge Madison County on to an ever-increasing production.

Because of the large territory comprised in Madison County and the many prospects and producing mines with which the mountains and gulches are diversified, it will be impossible to attempt more than a brief review of the many excellent properties worthy of mention that are particularly notable on account of their outputs and showing, and only a general reference can be made to the many really meritorious prospects that abound in all sections of the county.

Below is a comparison, wherein are shown the outputs for the years of 1896 and 1897:

Year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Value.
1896	17,644.502	$364,744.23	39,418.58	$50,965.43
1897	32,771.644	677,450.01	62,412.33	80,694.73
Increase	15,127.142	312,705.78	22,993.75	29,729.30

The large increase shown does not represent the actual conditions that prevailed in Madison County last year. While the production was much greater than in 1896, it was not 100 per cent greater. The increase shown is due in some measure to an almost universal response by mining men everywhere in the county to requests for information regarding their outputs. This had not been done the previous year.

Madison County is famous, in that it contains Alder Gulch, the greatest producer of placer gold the world has ever known. The yields of wealth by this gulch since its discovery in 1893 has been in excess of ninety millions of dollars. The pay dirt was worked for a distance of 16 miles by drifting. Alder Gulch heads well up into the mountain known as Old Baldy and flows northwest into the Ruby River above Laurin. Virginia City, the former capital of the State and at one time the metropolis, is situated about midway between the source and mouth of Alder Gulch.

Quartz mining is at present centered about the South Boulder Mountains, at Richmond Flat, Norris, Pony, Parrot, Sheridan, and Virginia City, and in the McCarty Range, at Rochester and Silver Star.

The mines at Richmond Flat are the Revenue and the Monitor, and are about 7 miles from Norris, the nearest railroad station. The former is owned and operated by the Revenue Mining Company and gives employment to about 40 men. The mine is worked through a shaft to a depth of less than 200 feet and the equipment consists of a hoisting plant. The ore is base, and treated by the cyanide process in a 50-ton plant about 1 mile from the mine, to which it is hauled by wagons. This property is among the large producers in the county.

To the west and adjoining the Revenue is the Monitor, owned by the Monitor Gold Mining Company. Employment is afforded to about 35 men. This property is worked to a depth of about 200 feet through a shaft. The product from this mine is similar to that of the Revenue, being a quartz that carries the gold in base form. It occurs in chutes along the vein, which varies in width from a few inches to several feet. It carries good values, and is shipped by rail to the smelters for reduction and treatment.

The Parnell mine is about 3 miles from Norris and belongs to the Montana Boy Consolidated Mining Company. The output is a free-milling gold ore treated in a 10-stamp mill run in connection with the mine.

The Little Kid mine is located about 17 miles from Norris and gives employment to about 15 men. The property is owned by F. W. Norenberg, and is developed and worked by tunnels to a distance of 400 feet. The character of the ore is free-milling gold, which is successfully treated in a 20-ton Bryan mill.

The principal property at Pony is known as the Clipper group and belongs to Elling & Morris. These mines are located 3 miles west of Pony and are developed by tunnels, the longest one being about 1,500 feet in length. A compressed-air plant operates seven drills for mining purposes. The greater part of the ore is free milling and is hauled by wagon for treatment to the 20-stamp mill located at Pony. This mill is run by water power, and on account of freezing does not work in the winter. In addition to amalgamation and concentration at the mill, a cyanide plant has been added, which secures any values that might otherwise escape. About 30 men are employed at the Clipper mines and mill.

The Galena mine is 2½ miles west of Pony and belongs to the Garnet Gold Mining Company. It is worked by two tunnels, each 900 feet long. Twenty-five men are employed at the mine and mill. The ore is a concentrating one, carrying gold, lead, and copper, and is treated at present in a 20-stamp mill owned by the company.

Considerable activity was shown about the Sand Creek district during the earlier part of the year. The principal producer there was the Chile mine, located about 3 miles south of Sappington. A 5-stamp mill is at the mine, which is developed by a shaft to a depth of about 100 feet. The ore is free milling. About 15 men are given employment when the mine is running. At present the property is idle. Three miles east of the new town of Parrot is the famous Mayflower mine that has grown to be one of the richest discoveries in the State during recent years. The Mayflower Mining Company, a corporation composed of Butte capitalists, own and operate the property. Development is by tunnels. The ore is a high grade, free-milling one that is sent to the smelters for reduction. Owing to some controversy over the ownership of the property and adjoining claims, the mine was idle

a portion of the year. All differences are reported to have been settled, and the future of this mine and district will be watched with a lively interest.

Hoffman & Chisholm own the Carolina mine, a property lying some distance northwest of Sheridan. This has been well developed, and the ore produced is sent to the smelters for treatment. Gold is the principal value in the ore.

At Leiterville, about 8 miles east of Sheridan, is another large property. This is the Leiter mine on Wisconsin Creek. The owners are L. Z. Leiter and T. B. Leiter. Work and development are carried on through tunnels, from one of which a shaft has been sunk to the depth of 400 feet. This is equipped with a first-class mine hoist.

The ore is free milling and treated in a 20-stamp mill situated 2,700 feet from the mine. A gravity tramway connects the two and transports the ore for treatment. About 55 men are employed at this property.

The Easton mine has been a heavy producer of silver and gold. It is the property of Henry Elling and is situated on Mill Creek, about 5 miles from Alder Gulch. The discovery and improvement of this property have both been of recent date. The development is by tunnels of considerable length which reveal valuable ore bodies. The second-class ores are worked by concentration in a plant at the mine, while the better grade of ore is treated in the Easton mill at the junction of Granite and Alder creeks. This mill, when in operation, handles about 30 tons of ore a day. Like other silver producers throughout the State, the Easton was idle a portion of 1897. The concentrator at the mine was operated from June 1 to December 31 and the product shipped to a smelter for treatment.

The Kennett mine is about 4 miles from Virginia City, on the divide between the Ruby and Madison valleys. Heavy improvements were undertaken during the year to place the property among the largest of the producing mines in the county. These included a comprehensive development of the mine and the erection of a 60-stamp mill at some distance from the mine. The extraction and milling of the ore, which is free milling and low grade, will be actively prosecuted during the coming summer. The building of the mill and the development at the mine have given employment to a considerable force of men.

The Thistle mine is the principal property in the McCarty Range in the western part of the county. It is located at Rochester.

Besides the mines named, many properties in Madison County have produced precious metals during the year, the total of which has been considerable. Development and prospecting are going on steadily, affording work for many men. Success is being generally realized by the mining class in all sections of the county.

The output from the placers of Madison County was a large item in the total production. Alder Gulch and its tributaries are still worked to a great extent. The German Bar Placer Mining Company erected and

operated a placer mining plant below Virginia City. Their operations proved to be successful, and they have since, by purchase and bond, acquired control of a large amount of placer ground in different sections of the county, on which they intend to erect machinery for handling the gravel and securing the gold. Besides the placers along Alder Gulch, other producing gulches were Bivens, Harris, Norwegian, and Barton.

MEAGHER COUNTY.

Meagher County is that part of Montana lying between the Big Belt and Little Belt mountains, near the center of the State. The output of precious metals in 1897 was as follows:

Metals.	Quantity.	Value.
Gold.....fine ounces..	282.598	$5,841.82
Silver.....do....	148,546.50	192,060.12
Lead.....fine pounds..	7,091,591	255,309.28
Total.....	.....	453,211.22

The production of gold was from the mines and placers of the portions that were formerly included in Meagher County and afterwards segregated by the legislature to be annexed to other counties.

Since the division of the county, the only district producing has been that about Castle. It was from this district that the silver and lead output originated. A large per cent of this output was contained in ore that had been mined and stored on the dumps at the different mines prior to the building of the Montana Railroad into this district. The mines at Castle now undergoing development preparatory to becoming producers include the Cumberland, Yellowstone, Great Eastern, and Judge. The ore from these is a carbonate and carries silver associated with lead. The Yellowstone is about 3 miles from Castle and employs about 15 men. This property is worked to a depth of 400 feet by a double compartment shaft equipped with hoisting engine and apparatus. The Great Eastern is about the same distance from Castle as the Yellowstone. The main shaft has reached a depth of only 115 feet and hoisting is done with a whim.

The Judge is equipped with a hoisting engine and explored to a depth of about 250 feet. The ore from all of these properties is shipped to lead smelters for treatment.

MISSOULA COUNTY.

Missoula County is in the western portion of the State, between Flathead and Ravalli counties. Since the closing down of the Iron Mountain Mine at Pardee, in last May, the precious metals yielded by this county have been from the placers along the various streams, principal among which are Cedar Creek and Quartz Creek. The output of gold and

silver in 1897 by Missoula County was valued at $58,714.79 and $402,502.98, respectively.

PARK COUNTY.

The yield of gold and silver from this county was small, and consisted almost entirely of placer gold from the streams in the Upper Yellowstone country.

RAVALLI COUNTY.

This county lies along the western boundary of the State, south of Missoula County. The principal producer in the county during the past year was the Helena and Victor Mining Company, whose property and plant are located at Victor. The mine of this company is known as the Curlew, which has a development of 200 feet in depth. The values contained in the ore are silver and lead.

The White Cloud Mine is a Ravalli County property, which is being put in shape to undertake a large production in the near future. It is situated about 8 miles from Florence. Development has reached a depth of over 150 feet. A steam hoist raises the ore to the surface. This is a pyritic iron carrying gold. A concentrator having a capacity of 150 tons is being erected.

SILVERBOW COUNTY.

Silverbow County lies south of Deer Lodge County, and is the largest precious metal producing region in the world. The mining activity is centered about the city of Butte, which is characterized as the greatest mining camp on earth. All of the mines are within a radius of 3 miles from the center of Butte, and their production in 1897 was as follows:

Metals.	Quantity.	Value.
Gold ..... fine ounces..	54,198.037	$1,120,372.86
Silver ..... do....	10,710,815.45	13,848,327.04
Copper ..... fine pounds..	236,826,597	a 26,761,405.46
Total	.....	41,730,105.36

a At $11.30 per hundredweight.

Corresponding figures for the previous year of 1896 were—

Metals.	Quantity.	Value.
Gold ..... fine ounces..	59,815.755	$1,236,501.40
Silver ..... do....	11,120,731.78	14,378,319.89
Copper ..... fine pounds..	228,886,962	a 25,005,900.60
Total	.....	40,620,721.89

a At $10.92½ per hundredweight.

This is an increase of more than a million dollars in this county during the past year.

The production of the Butte mines dates from 1882, and the following table shows the output to have been more than $383,000,000 during the past sixteen years.

Year.	Gold.	Silver.	Copper.
	Fine ounces.	*Fine ounces.*	*Fine pounds.*
1882	12,093.750	2,699,296.38	9,058,284
1883	14,560.875	3,480,468.75	24,664,246
1884	21,776.006	4,481,180.36	43,093,054
1885	13,838.297	4,126,677.60	67,797,864
1886	31,223.450	5,924,180.38	57,611,485
1887	48,175.743	6,958,822.92	78,700,000
1888	44,320.062	8,275,768.87	98,504,000
1889	31,652.325	6,560,038.75	104,589,000
1890	25,704.730	7,500,000	112,700,000
1891	29,395.356	7,985,089.77	112,383,420
1892	36,222.560	8,311,130.82	158,413,284
1893	33,807.877	6,668,730.16	159,875,499
1894	36,768.015	7,561,124.46	185,194,385
1895	41,433.363	10,051,760.52	197,190,659
1896	59,815.755	11,120,731.78	228,886,962
1897 (estimated)	58,500	11,900,000	236,800,000
Total	539,288.164	113,605,001.52	1,875,462,242

Figuring the gold and silver at their coinage values and copper at 12 cents per pound, the total output of the three metals in Silverbow County has been:

Gold	$11,148,075.74
Silver	146,883,234.29
Copper	225,055,469.04
Total	383,086,779.07

The above figures convey a better idea of the scope of mining in Silverbow County than any description of the many mines, hoists, and smelters can do, and none will, therefore, be attempted other than to give some data generally taken as authentic in connection with the Anaconda Company, which operates the most extensively of any located in the Butte district. Nearly $80,000,000 have been expended by this company in the development and operation of its mining interests and the erection and operation of its immense smelting plant at Anaconda.

The company owns about 100 of the best lode claims in the Butte district, on which one of the most perfect hoists ever built has been erected. This is capable of sinking to the great depth of 5,000 feet.

The development of these mines has been kept ahead of the output until an aggregate of 3,000,000 tons of ore are in sight. The company conducts general mercantile, lumber, and other business enterprises that are each the most stupendous of its kind in the Northwest. The

number of men employed at the mines is 2,500, and at the smelters about 3,000. The mines of the Anaconda Company are developed and worked to a depth of 1,300 feet.

Among the companies that are mining and smelting extensively at Butte are the Anaconda, the Boston and Montana, the Parrot, the Colorado, the Montana Ore Purchasing Company, the Butte Reduction Works, the Lexington, and the Alice.

An industry that yields a large amount of copper is that of the copper precipitation plant. It is located on the side hill just below the Anaconda mine. As the water impregnated with sulphate of copper in solution is pumped from the mine it is led into a large number of vats filled with all sorts of scrap iron and tin cans. Chemical action occurs, and the copper is precipitated and its place in the soluble salt taken by the iron. The recovery by this plant averages 100 tons of metallic copper per month.

DEPOSITS AT THE UNITED STATES ASSAY OFFICE, HELENA, MONT., DURING THE CALENDAR YEAR 1897.

Counties, etc.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
MONTANA.					
Beaverhead	8,419.937	$156,849.94	560.33	$295.58	$156,945.52
Broadwater	1,501.741	27,939.33	207.21	104.61	28,043.94
Carbon	123.707	2,301.54	8.37	4.17	2,305.71
Cascade	23.385	435.07	1.92	.90	435.97
Choteau	16.688	310.47	1.81	1.00	311.47
Custer	5.819	108.26	.48	.26	108.52
Deerlodge	19,341.439	359,840.62	3,989.98	2,102.41	361,943.03
Fergus	3,146.948	58,547.84	226.54	121.98	58,669.82
Flathead	1,283.992	23,888.21	313.97	169.70	24,057.91
Granite	4,148.406	77,179.64	1,132.23	618.04	77,797.68
Jefferson	2,449.236	45,567.11	416.59	215.69	45,782.80
Lewis and Clarke	22,947.347	426,927.05	13,083.54	6,720.26	433,647.31
Madison	6,695.629	124,569.81	1,836.66	939.09	125,508.90
Meagher	313.998	5,841.82	31.60	17.02	5,858.84
Missoula	2,747.035	51,107.55	104.20	51.86	51,159.41
Park	470.390	8,751.47	67.04	34.28	8,785.75
Ravalli	90.855	1,690.32	8.28	4.17	1,694.49
Silverbow	3,364.360	62,592.70	707.69	358.48	62,951.18
Teton	122.638	2,281.65	5.64	3.08	2,284.73
Total	77,213.550	1,436,530.40	22,704.08	11,762.58	1,448,292.98
OTHER SOURCES.					
Idaho	20,453.561	380,531.20	3,520.40	1,850.67	382,381.87
Washington	4,634.212	86,217.86	1,091.13	577.19	86,795.05
Oregon	2,342.352	43,578.64	474.95	257.08	43,835.72
Wyoming	6.759	125.75	.45	.27	126.02
Utah	28.368	527.78	.09	.05	527.83
Canada	17,298.561	321,833.65	5,041.86	2,698.38	324,532.03
Jewelry	140.077	2,606.08	40.79	22.69	2,628.77
Redeposits	282.422	5,254.38	131.48	72.27	5,326.65
Total	45,186.312	840,675.34	10,301.15	5,478.60	846,153.94
Grand total	*122,399.862*	2,277,205.74	33,005.23	17,241.18	2,294,446.92

PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1897.

Counties, etc.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Beaverhead	12,383.324	$255,986.03	216,673.67	$280,143.73
Broadwater	11,644.357	240,710.22	409,567.84	529,542.26
Carbon	111.336	2,301.52	7.53	9.74
Cascade	490.046	10,130.15	385,844.69	498,869.90
Choteau	216.066	4,466.48	21.43	27.71
Custer	5.237	108.26	.43	.56
Deerlodge	18,143.307	375,055.44	9,111.45	11,780.46
Fergus	3,148.559	65,086.49	237.36	306.89
Flathead	1,168.494	24,154.91	61,209.75	79,139.88
Granite	9,136.252	188,863.09	450,188.26	582,061.59
Jefferson	7,878.934	162,872.02	761,240.64	984,230.32
Lewis and Clarke	31,762.517	656,589.49	131,077.04	169,473.34
Madison	32,771.644	677,450.01	62,412.33	80,694.73
Meagher	282.598	5,841.82	148,546.50	192,060.12
Missoula	2,840.328	58,714.79	311,310.90	402,502.98
Park	423.351	8,751.44	60.34	78.01
Ravalli	87.669	1,812.28	30,301.42	39,177.58
Silverbow	54,198.037	1,120,372.86	10,710,815.45	13,848,327.04
Teton	110.374	2,281.63	5.08	6.57
Returns from custom smelters, mints, and assay offices, impossible to classify by counties	30,712.416	634,881.99	3,118,713.95	4,032,276.62
Total	217,514.846	4,496,430.92	16,807,346.06	21,730,710.03

BULLETIN OF MONTANA PRODUCTION DEPOSITED AT HELENA ASSAY OFFICE DURING THE CALENDAR YEAR 1897.

Origin.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
Placer gold	27,051.013	$503,274.24	3,324.44	$1,688.07	$504,962.31
Mill bullion	50,162.537	933,256.16	19,379.64	10,074.51	943,330.67
Total	77,213.550	1,436,530.40	22,704.08	11,762.58	1,448,292.98

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1897.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coinage value.	
ASSAY OFFICES.					
Helena	77,213.550	$1,436,530.40	22,704.08	$26,419.29	$1,462,949.69
New York	35,637.561	663,024.39	1,521,810.22	1,770,833.71	2,433,858.10
Boise	3,362.195	62,552.46	179.16	208.48	62,760.94
MINTS.					
Philadelphia	722.317	13,438.46	1,476.83	1,718.49	15,156.95
Denver	118.318	2,201.26	12.48	14.52	2,215.78
San Francisco	99.484	1,850.86	7.63	8.88	1,859.74
Total	117,153.425	2,179,597.83	1,546,190.40	1,799,203.37	3,978,801.20

PRODUCTION OF GOLD AND SILVER IN MONTANA (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1897.

Origin.	Gold.		Silver.		Grand total.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	33,418.923	$690,830.43	5,098.48	$6,591.97	$697,422.40
Mill bullion	66,135.432	1,367,140.71	633,643.85	819,256.69	2,186,397.40
Cyanide mill bullion	9,993.117	206,576.06	33,937.50	43,878.79	250,454.85
In copper ores	51,463.070	1,063,836.08	10,710,317.02	13,847,682.60	14,911,518.68
In lead ores	8,529.345	176,317.22	4,175,792.56	5,399,004.52	5,575,321.74
In dry ores and concentrates, classed as smelting ores	47,974.959	991,730.42	1,248,556.65	1,614,295.46	2,606,025.88
Total	217,514.846	4,496,430.92	16,807,346.06	21,730,710.03	26,227,140.95

ORIGIN, BY PERCENTAGES, OF THE PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1897.

Origin.	Gold.	Silver.
	Per cent.	*Per cent.*
Placer bullion	15.36	0.03
Mill bullion	30.40	3.77
Cyanide mill bullion	4.60	.20
Copper ores	23.66	63.72
Lead ores	3.92	24.85
Dry ores	22.06	7.43
	100	100

PRODUCTION OF COPPER AND LEAD IN MONTANA DURING THE CALENDAR YEAR 1897.

Summary, by counties.	Copper.	Lead.
	Fine pounds.	*Fine pounds.*
Beaverhead	184,836	1,090,175
Broadwater	.....	1,848,111
Cascade	.....	1,338,836
Flathead	.....	1,920,000
Granite	19,473	.....
Jefferson	10,000	366,015
Lewis and Clarke	.....	25,000
Madison	17,890	88,319
Meagher	.....	7,091,591
Missoula	1,929	3,620,331
Ravalli	.....	382,272
Silverbow	236,826,597	.....
Custom smelters, in addition to the above	97,815	8,024,324
Total	237,158,540	25,794,974

DISPOSITION OF GOLD AND SILVER OF MONTANA PRODUCTION DURING THE CALENDAR YEAR 1897.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	105,438.083	$2,179,597.83	1,391,571.36	$1,799,203.37	$3,978,801.20
Shipped to custom smelters and refineries, by producers	112,076.763	2,316,833.09	15,415,774.70	19,931,506.66	22,248,339.75
Total	217,514.846	4,496,430.92	16,807,346.06	21,730,710.03	26,227,140.95

TOTAL PRODUCTION OF PRECIOUS METALS IN MONTANA DURING THE CALENDAR YEAR 1897.

Description.	Quantity.	Value.
Gold, fine ounces	217,514.846	$4,496,430.92
Silver, fine ounces (coinage rate)	16,807,346.06	21,730,710.03
Copper, fine pounds	237,158,540	a 26,798,915.02
Lead, fine pounds	25,794,974	b 928,619.06
Total value		53,954,675.03

a At $11.30 per hundredweight. b At $3.60 per hundredweight.

IMPROVED METHODS OF TREATMENT AND DREDGING.

Herewith is presented a brief description of those methods of treatment and dredging that have proven successful in this State and promise to exert a wide influence on an increased future production.

Copper, silver, gold, and lead, in the order named, constitute the metals from which the mineral wealth of the State is derived. Nearly the entire silver output and a large percentage of the gold are by-products of copper and lead ores. These are treated by smelting and concentration, and under this heading is set forth the method by which the greatest values are obtained. The other improvements are in the line of saving gold and silver values by the so-called cyanide process and of gathering gold from placers by dredging plants. These are separately treated below.

SMELTING AND CONCENTRATION.

This branch of ore treatment is divided into two main systems: (a) Matting, or the gathering of values with a copper base; (b) lead smelting, or the gathering of values in a base of lead.

MATTE SMELTING.

The copper ores of Butte, as well as the high-grade auriferous ores tributary to Butte, are treated in this way. The establishments in Montana so operating together have a capacity exceeding 10,000 tons

BIRD'S-EYE VIEW OF BOSTON AND MONTANA SMELTER, GREAT FALLS, MONTANA.

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PANORAMA OF CARROL AND THE LOWER WORKS, ANACONDA.

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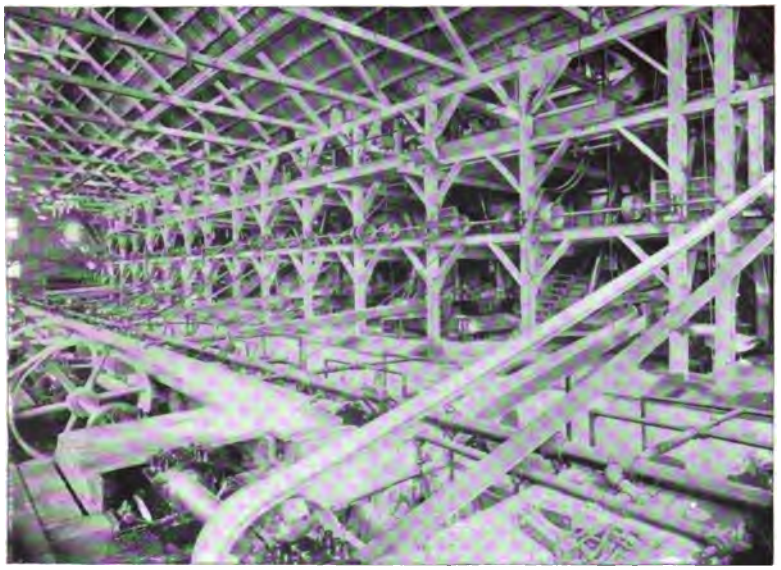
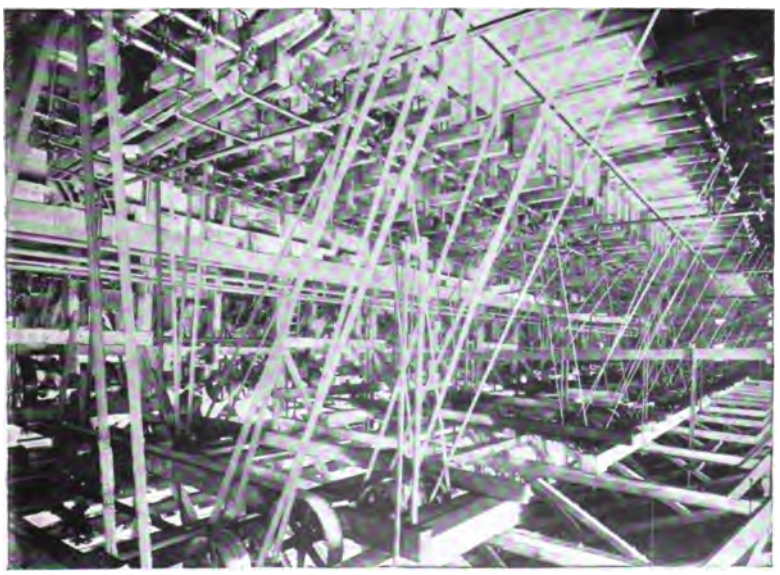
PANORAMA OF CARROL AND THE LOWER WORKS, ANACONDA.

DRILLING THE ORE.

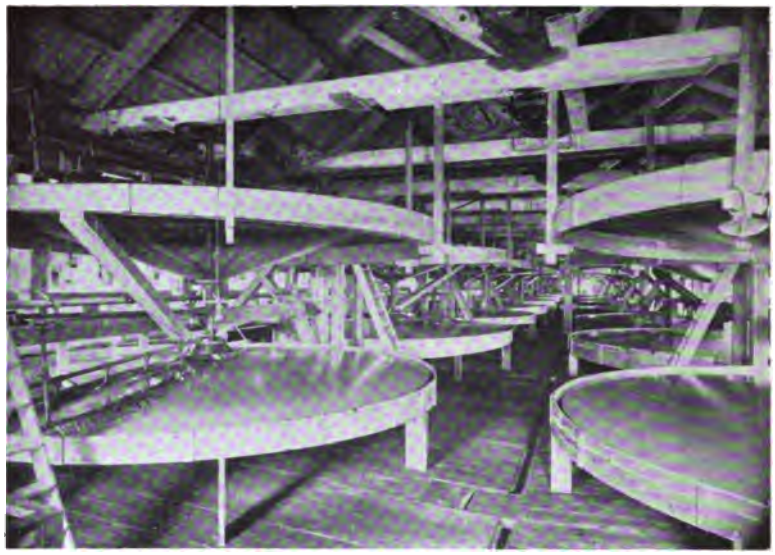
EAST SILL FLOOR BREAST. MINERS AT WORK.



PERSPECTIVE VIEW OF STAMP FLOORS, UPPER WORKS, ANACONDA.



PERSPECTIVE VIEW OF THE HART JIGS, ANACONDA.



ROUND TABLES, LOWER WORKS, ANACONDA.

ROUND JIGS, LOWER WORKS, ANACONDA.

of ore per day, and are as follows: The Anaconda Copper Mining Works, located at Anaconda; the Boston and Montana Consolidated Copper and Silver Mining Company's works, located at Great Falls; the Colorado Smelting and Mining Company's works, located at Butte; the Montana Ore Purchasing Company's works, located at Butte; the Parrott Smelting and Mining Company's works, located at Butte; the Butte Reduction Works, located at Butte.

The new plant of the Parrot Smelting and Mining Company at Gaylord, some 35 miles east of Butte, on a spur of the Northern Pacific Railway, is in course of construction, and when completed should make a most efficient plant. The power will be hydraulic, and the buildings are framed with structural steel. Some three-quarters of a million dollars are said to have been spent already on the works. The earliest date set for the completion of the plant is the fall of 1898.

In a general way the operation of these plants are the same; briefly, the process of treatment may be mentioned under the following heads:

Proper crushing and sizing of crude ore with water concentration; roasting concentrates; reduction of calcined concentrates and the better grade of crude ore in the reverberatory furnaces to copper matte; converting of copper matte into "blister copper;" smelting in shaft blast furnaces of converter lining with the higher grade and crude ores; poling or casting; refining of "blister copper;" refining of "slimes" of gold and silver from electrolytic vats.

Concentration.—The bulk of crude ore coming from the mines is composed of large proportions of silica and feldspar, carrying little or no values in gold and silver, associated with the heavier sulphide minerals. By disintegration of the particles and by reason of the differences in specific gravity a separation is made which is termed concentration. The systems of crushing used in this work are of two types, either the huge steam stamp, as used at the Anaconda Works, or the Blake crusher and Cornish rolls, representative of the most improved form of which may be mentioned the concentrating mill of the Colorado Smelting and Mining Company. A very complete and interesting description of the several concentrating mills for Butte ores may be found in the Transactions of the American Institute of Mining Engineers, Vol. XXVI.

Roasting.—Heap and kiln roasting being largely done away with in recent years, Butte ores have offered a particularly advantageous field for the use of the so-called mechanical roasters over the reverberatory calcining furnaces operated by manual labor, which latter have been abandoned. There are several types of such mechanical furnaces which are used at different establishments, those of principal interest being as follows:

The "Bruckner," being a cylinder ($8\frac{1}{2}$ by $18\frac{1}{2}$ feet), rotating around its axis, which lies horizontal, with openings at each end, one to permit of the introduction of heat from a movable fire box, and the other to

permit the escape of the fumes to "dust chambers" and stack. These furnaces are used in large numbers at the Anaconda and the Boston and Montana works.

The "O'Hara" furnace is a rectangular mechanical furnace, in which the rabbling or exposing fresh surfaces of ore to the influence of the heat is done by a moving chain or chains with frames of plows attached. The ore is fed and discharged automatically.

The "Pearce" furnace is similar in principle, except the furnace is circular and has been constructed with two hearths, one above the other, the ore passing from the upper to the lower deck for completion of the roasting operation. The ore and fuel are automatically fed and discharged in these furnaces. They are used at the Colorado Works.

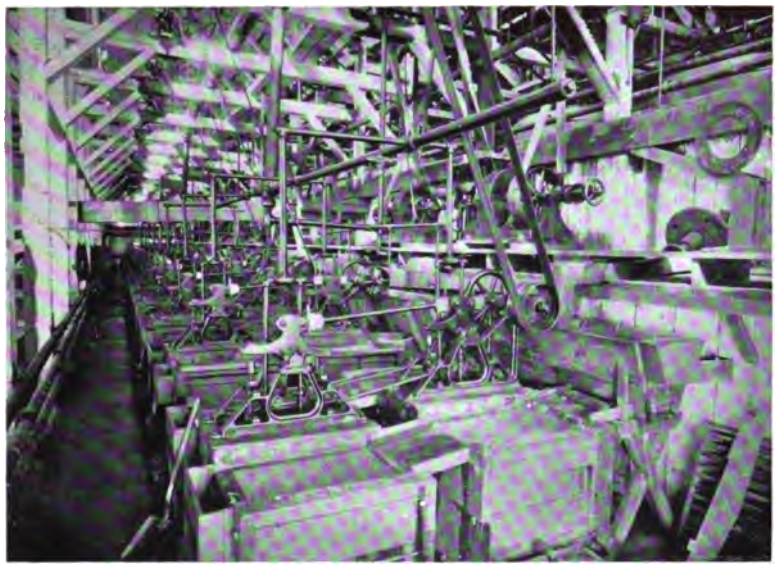
The "Wethey" and the "Keller" furnaces are modifications with greatly improved mechanical detail of the well-known "Spence" furnace. These furnaces have been constructed at the Butte Reduction Works and the Parrot Works. Great economy is claimed for both.

Smelting.—After roasting concentrates or ore to 7 per cent or 8 per cent sulphur it is introduced into reverberatory furnaces, where it is reduced to 50 per cent or 60 per cent copper matte, containing most of the gold and silver. In the construction of these furnaces we have most interesting results of the skill of Western metallurgists. At the Boston and Montana works, in Great Falls, we find the large reverberatory tilting steel hearths of Pennsylvania. The operation of these furnaces is described by William Braden in a paper contained in the Transactions of the American Institute of Mining Engineers, Vol. XXXI.

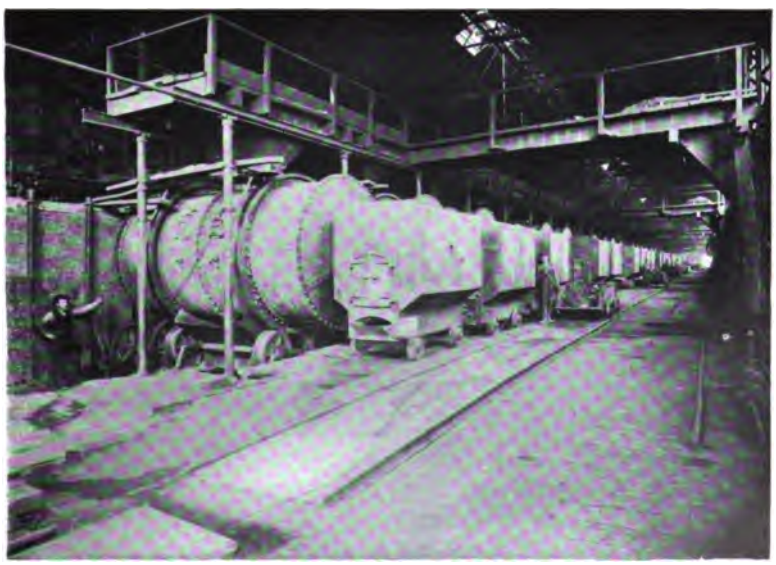
In the stationary reverberatory smelting furnaces the size has been so increased in the past ten years as to entail a great reduction in cost of fuel and labor. Where the blast furnace is used in the western United States the advance made in the last few years has been so great that one modern blast furnace will do the work of thirty ordinary reverberatory furnaces of ten or twelve years ago.

Converting.—Upon reaching the stage in smelting where the matte contains 50 per cent to 60 per cent copper it is ready for "converting," which is a process similar to the "Bessemerizing" of iron to steel. The sulphur contained forms the chief product of combustion, in combination with a powerful air blast introduced into a pear-shaped vessel swinging on trunnions, called a "converter," and the iron contained in the matte combined with the silica of the lining of the converter to form a slag, which is at times skimmed off, as, being lighter in specific gravity, it floats on top of the bath of molten copper. The tendency has been to increase the size of converters since their introduction at the Parrot Works. The converters in use at the Boston and Montana works now approximate in size the steel converters in Pennsylvania.

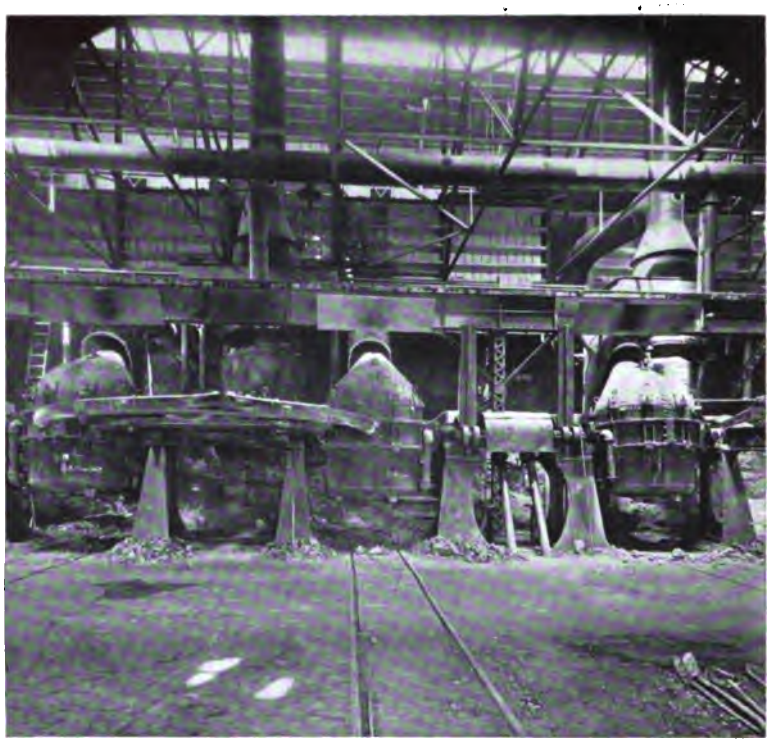
The systems used in different parts of the West for transferring the matte from the smelting furnaces to the converters differ materially. At the Anaconda Works the matte is hauled over half a mile on an *electric tram.* The matte is of course allowed to cool, is remelted in



JIGS AT THE LOWER WORKS, ANACONDA.



THE BRUCKNER ROASTERS, LOWER WORKS, ANACONDA.



THE CONVERTING ROOM, ANACONDA.

INTERIOR OF ELEVATOR TANK HOUSE, UPPER WORKS, ANACONDA.

cupola furnaces just above the converters, and then tapped from these furnaces into the converters, each cupola supplying two converters. At the Boston and Montana works and others the matte is taken directly to the converters without this remelting in cupolas by means of electric cranes with a suspended ladle, which runs the entire length of the furnace and converter room, the latter being directly in front and below the former.

It may not be out of place to remark here that at the Copper Queen mine, in Arizona, owing to the peculiar composition of the ores, smelting (partially pyritic) is carried on in blast furnaces, and the matte so produced is converted practically direct from the furnace.

Smelting in shaft-blast furnaces at copper works.—With certain additions of lime rock and coke to the worn and broken linings from the converters and copper and gold ores, the smelting is done in shaft-blast furnaces. No particular advance in the construction or operation of these furnaces as applied to copper smelting in Montana is noted, though in other sections of the West and Northwest very great advances have been made in the practice of this class of smelting.

At Deadwood, S. Dak., smelting is done with a very small fuel consumption, a highly siliceous slag, and very slight losses, with not to exceed one-half of 1 per cent copper on the charge. A very few years ago this would have been pronounced an impossibility. At Nelson, British Columbia, a large blast furnace has been operated smelting Hall-mines ore. Very high tonnage (over 300 tons per twenty-four hours) has been run through this furnace. Although the losses in values, especially silver, are high, the cost of fuel and labor per ton of ore treated has been greatly reduced with the introduction of this furnace.

Poling or casting.—In Montana most of the copper matte produced is Bessemerized or converted to blister copper within the State, though formerly this matte was largely sent to the Eastern States for further reduction. Moreover, at present about one-half of the Anaconda blister copper is refined in Montana. The bars of blister copper, weighing 200 pounds, are melted down in reverberatory furnaces and *poled*, which is a process for reducing small quantities of oxide present by plunging green poles into the molten bath of copper. After proper "settling" in this way the copper is ladled into flat molds with T heads, and the slabs when cooled are termed anodes, containing 98 per cent or more of copper, ready to be suspended in electrolytic vats to be refined.

Doing away with casting this anode by remelting converter bars has been tried, but not with signal success so far, although a plant for this purpose was being tested at the Anaconda Works during a visit by the writer to that establishment during the past year, and no doubt practical results may be looked forward to.

Refining.—In Montana the practice in electrolytic refining is the arrangement of the vats in a series of rows, and electric traveling cranes handle the sets of anodes and cathodes. The cathodes are thin strips

of electrolytic copper, which alternate with the anode castings. The electrolytic is a copper sulphate solution, which is held at a standard of strength and kept moving through the series of vats.

Upon an electric current being introduced the copper is deposited from the anodes on to the cathodes, and the silver, gold, and impurities contained in the anode castings drop to the bottom of the vats in the form of a slime or mud. The copper deposited on the cathode strips is melted and molded into bars, when it is ready for commercial use.

Refining of slimes.—At the Anaconda works the slimes of gold and silver are reduced to Doré bullion at the works. The Boston and Montana slimes are sent East.

LEAD SMELTING.

The establishments in Montana operating with lead as a base for gathering precious metal values are as follows: The United Smelting and Refining Company's works at East Helena and at Great Falls, and the Hecla Consolidated Mining Company's works at Glendale.

The full capacity of these combined plants is about 1,000 tons of ore per day. Small furnaces have been constructed at Sheridan and Twin Bridges, in Madison County, but have not been operated with success. At the new plant of the Parrot Company, at Parrot, it is said some lead smelting will be done. A feature to be noted in regard to lead-smelting works is that they are almost entirely custom plants.

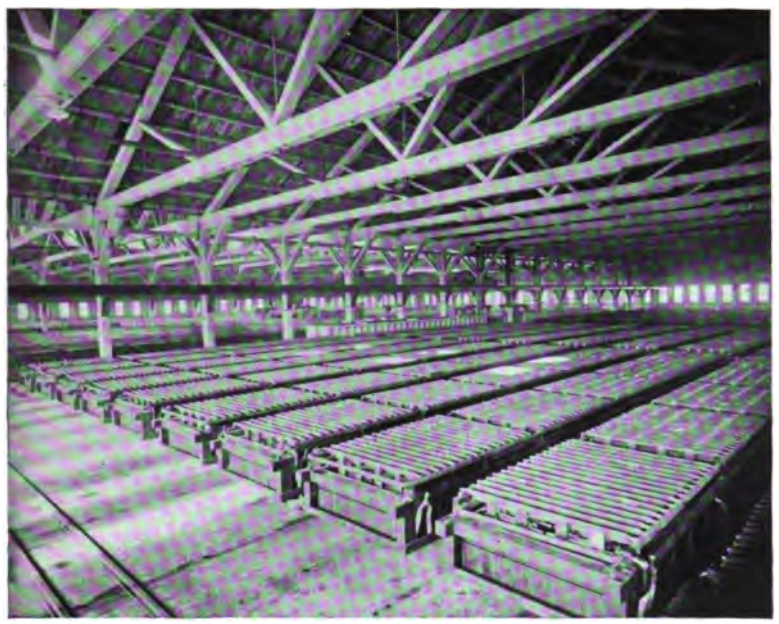
This is true not only in Montana but throughout the Western States, and where small isolated plants have been constructed success has been the exception to the rule. This is readily understood when it is seen that ore can be handled much more economically in a large establishment centrally located as to transportation and fuel facilities.

The system of the modern lead-smelting plant is receiving and sampling, roasting, smelting, refining.

Receiving and sampling.—Upon receipt of an ore, determination is made as to its character; if it is a sulphide it is crushed, sampled (generally by hand), and roasted; if an "oxidized ore," it is sampled and is ready for the blast furnace without further preparation.

To gain as uniform composition for the blast furnace as possible, beds of ore are made by spreading in layers the different classes of ore received. The beds, when completed, contain from 2,000 to 5,000 tons of ore. Sampling is done almost entirely by hand.

Roasting.—In lead smelting, roasting is done almost entirely now by the hand-rabbled reverberatory calcining furnaces, mechanical furnaces not having proved satisfactory. In some cases slagging hearths are provided to these roasting furnaces, and after the ore has been properly roasted the charge is drawn into a hearth directly behind the fire box, where the calcines are fused to a slag which is afterwards cooled, broken with sledges, and is then ready for the blast furnace. Again, the heat is raised when a charge is ready to be drawn from the calcining hearth, and the calcines in the front part of the furnace are partially fused to



EXTENSION OF ELECTROLYTIC REFINERY, ANACONDA.

Refining.—All of the base bullion produced in Montana is shipped to the East for further separation of the gold, silver, and lead.

To summarize, the smelting industry in Montana shows more important proportions than in any other State in the Union, and many times the amount of ore is smelted. Therefore, the facilities to the miner are obviously superior.

TREATMENT OF MILL TAILINGS.

The extraction of gold and silver values from tailings and ores by the "cyanide process" has assumed a place of importance in Montana.

During the past year the Montana Mining Company, Limited, following some experiments made in the year previous, undertook the treatment of its tailings by the cyanide process and constructed a plant with a capacity of 400 tons of tailings per day. G. W. Merrill, metallurgical engineer, in charge of the operations of the plant, has given me the following notes regarding it:

The tailings beneficiated during the preceding summer in the new cyanide plant of the Montana Mining Company, the largest then in operation in this country, were taken from what is known as their No. 5 Dam.

This bed, the lowest of the five, situated in Silver Gulch, is about 6 miles from Marysville, and contains a much greater portion of slimes than the upper beds, owing to the fact that it has been largely used for final settling and clarifying of the water. Therefore, the first step in the process of treatment—that of putting the material in suitable shape for leaching it on to the cars—is one requiring considerable care. In order that this point may be perfectly clear, it should be explained that in the operation of any lixiviation plant, the material handled from day to day should be as nearly uniform in fineness as it is practicable to obtain it, and also as few slime lumps as possible should be charged into the leaching vats, because they are not only impermeable to the solution, but soak it up and do not release the values so dishonestly obtained.

To accomplish this preparation, the bed is plowed, harrowed, and worked over continually, in order to dry and partially pulverize the lumps. The further precaution is observed of so selecting the material from different areas on the bed as to give comparatively uniformly leaching charges each day.

The second step, that of loading the cars, is accomplished in the old Mormon fashion, using traps or bridges over railroad cuts and scrapers for moving the material. The pattern of the latter is known as the Fresno Buck scraper, and the economy and advantage of their use will be appreciated by contractors when it is stated that we have been loading approximately 400 cubic yards per day with 6 men and 12 horses, with an average haul of not less than 100 feet. The use of the steam shovel in this work is prohibited by the fact that the material must be dried and pulverized on the surface of the bed before loading.

The cars used are of 3 tons capacity with bottom discharge, and 16 loaded cars make the train for a 22-ton locomotive. The latter is of the saddle-back type, 9-foot wheel base, with 6 drivers carrying all the weight. The rails are 56-pound Northern Pacific third class, the gage 3 feet, the maximum curve 30 degrees, and the maximum grade 3 per cent.

The plant is 2½ miles above the Number 5 Dam, and the tailings, after leaving the cars, pass in an almost continuous stream to the sheet-iron lining of the bin and out of the gate to a 24-inch 4-ply conveyor, which conducts them to a revolving chute or distributer, and this in turn fills a vat 38 feet in diameter by 9 feet deep with *400 tons of tailings in* about eight hours.

The great advantage in filling a tank in this way is that it gives a charge of more uniform permeability than any other method of filling known to the writer.

There are four of these tailing vats, each with its bin, conveyor, and distributer, and one is charged daily, thus giving four days to complete the treatment of each charge, which consists in saturation, lixiviation, washing, and discharging. The latter is accomplished by sluicing with 2½-inch hose, the water being under a 60-foot head, through four side-discharge gates, and one bottom-discharge valve in the center of the vat. By this method 400 tons are discharged in three hours or less, at a cost of less than 2 cents per ton.

The solution tanks are 10 in number and consist of four precipitating tanks 22 feet in diameter by 14 feet 9 inches deep, and two storage or supply tanks 38 feet in diameter by 9 feet deep. There are also two water tanks 22 feet by 14 feet 9 inches, for the storage of 80,000 gallons of water.

The power equipment consists of a 50-horsepower boiler; one 25-horsepower engine; one 10-horsepower engine for running conveyors; one 30-light dynamo; one Knowles economical geared pump, 4-inch inlet and discharge; two Worthington all-iron duplex solution pumps, 5-inch suction and 4-inch discharge, and one 2-drill air compressor.

The tailings are the lowest grade in gold of any being worked in this country; they are the most rebellious of any being worked in the world, because they contain copper carbonates and sulphide tetrahedrite, arsenical polybasite, and ruby silver. The plant operated under the most unfavorable climatic conditions, being in the most northern latitude of any known to the writer; but in October and November it exceeded the predictions of profit by nearly 50 per cent, and netted about double that which the company thought would justify the erection of a plant.

The water supply comes from Sawmill Gulch, a mile distant, and is carried by a ditch opposite the plant and then siphoned to the tanks above the plant.

All tanks and vats are made of California redwood, and all gates, valves, and ironwork connected with them were furnished by California firms. All machinery and railway equipment were purchased in the East.

Cost of plant proper was	$56,000
Cost of railway was	14,000
Cost of railway equipment was	12,000
Total	82,000

GOLD DREDGING IN MONTANA.

Coincident with Marshall's discovery of gold in 1848, placer mining in the United States became an important industry, and the pan, rocker, bumper, Long Tom, sluice, and hydraulic have since followed each other as improvements. The demoralization of silver mining and the recent financial unrest caused the earnest attention of miner and investor to be turned to the large deposits of hitherto unworkable placers in search of some method for profitably extracting the gold contained.

The energy and thought given to this subject have so far found expression in a dredge as being best adapted to all requirements, and herein will be set forth the results and workings of such dredging experiments as have been accomplished in the State of Montana up to the present time.

It is now generally recognized that two principal conditions characterize placer mining. These are the mining of gravel lying under water, *and dry or land mining.* To meet the conditions of the first, a floating

dredge has been designed, and for the second a so-called "traction dredge" has come forward. Although differing widely in construction and operation, the difference is principally in the appliances for excavation and method of delivery of the gravel to a sluice box, where the pulp is disposed of similarly in both and the gold obtained.

Floating dredges, or those designed for working ground lying under water, were operated successfully on Grasshopper Creek, in Beaverhead County, during 1897. Traction dredges, or land-mining machines, were employed satisfactorily at Washington Gulch, Deer Lodge County, and in Alder Gulch, near Virginia City.

In the earlier dredging operations under water the raising of auriferous gravel was generally attempted by suction, but without material success. This was followed by "digging" the gravel, and these efforts have generally been successful.

Some three years ago a dredge was built on Grasshopper Creek, near Bannack, that has been designed after the style of those working in New Zealand and Australia. The first season was unsatisfactory, but from the knowledge that had been gained this dredge was remodeled and rebuilt. The results of the second season were more encouraging, but the following winter saw still another rebuilding of the dredge. This was followed with satisfactory results. A second dredge was launched last June, and a third, for the Bon Accord Mines, Limited, is about completed.

The second plant installed was named the "A. F. Graeter," and has been in operation some five months. It is 102 feet in length, 36 feet wide, and draws about 3 feet of water. The framework is of heavy timbers, closely braced, and, together with the engines, boilers, and other machinery carried, the total weight is approximately 700,000 pounds. Preparatory to launching a dam is built across the gulch so that sufficient water is impounded. When operations commence the washed gravel is deposited behind and the dredge follows into the excavation it has made, to continue work.

Steam is generated by two tubular steel boilers of the locomotive type. The fireboxes and grates are arranged to burn wood. These boilers are of 125-horsepower capacity each. Immediately back of the boilers is placed a set of engines which drive the buckets, raise and lower the bucket ladder or frame, and run the guy lines, which are attached at the front of the dredge and anchored outside, so that the dredge can be swung in a circle on the "spud" for digging purposes.

This spud acts as an anchored pivot at the forward end of the boat.

The engines and machinery are fully under the control of an engineer, stationed above the upper deck. He has observation of operations and handles the plant as required by means of a set of levers connecting with the engines.

Directly in front of and below the engineer is the ladder on which an endless chain of 36 buckets for digging is worked. These traverse this ladder, the lower end of which is vertically adjustable as to depth by

FRONT VIEW OF FLOATING DREDGE.

BOAT SYSTEM OF SLUICE BOXES.

means of suspensory cables passed over a frame above and wound upon a drum at the engine. This ladder is swung at the upper end upon a permanent 4⅜-inch horizontal shaft and permits the buckets to excavate gravel to a depth of 38 feet under water. Power is transmitted to the shaft by a sprocket-and-chain connection from a 75-horsepower engine. Between the bearings this shaft is fitted with a pulley having five faces or wearing plates, to fit the links of the chain carrying the buckets, and communicates the motive power to the chain and buckets for digging in the gravel. This chain swings loose below, so that each bucket has a horizontal drag of 8 feet in the gravel, and its loading is accomplished. It then passes over the pulley fixed into the lower end of the frame, similar to the driving pulley above. The lower one, however, is provided with six faces to fit the links and is flanged to prevent any lateral motion or slipping off of the chain while working. The loaded buckets pass up the ladder way, which is fitted with steel rollers at short intervals for carrying the load, and when traveling over the upper pulley empty themselves into a hopper.

These buckets and links are made of annealed Bessemer steel, with the rim and other wearing parts riveted on, so that a renewal can be made from time to time. The links are 2½ feet long, each alternate link being cast with the bucket. Because of the gravel causing excessive wear of the bearings, rubber guards are used to protect the bucket-chain connections. These connections have a bushing of hard steel, working on a stationary pin of soft steel, besides other devices, and reduce the actual wear of the cast link to a minimum. The buckets have a capacity of 5 cubic feet and travel at the rate of 14 per minute. The dredge is equipped at the rear end with two spud timbers 42 inches by 18 inches by 50 feet in size and weigh over 11,000 pounds each. These are each fitted with a pointed-steel wearing shoe at the lower end and with the necessary gearing for raising and lowering. These spuds are for anchoring and for moving the dredge forward or backward, they being raised alternately by means of hoisting cylinders of 24 tons capacity and dropped after the dredge has been swung by the engineer in the pilot house, through the cables passed around the front corners of the boat to a fixed lateral anchorage. The boat is thus "walked" ahead. While excavating, one of these spuds rests in the gravel and forms a pivot, around which the boat is swung as the gravel is taken up. By means of the suspensory cables carrying the bucket ladder this ladder is lowered about 6 inches with each swing of the dredge around the anchored spud. Thus, with the drag of the bucket, a segment of gravel 6 inches deep and 8 feet wide is excavated. A successive lowering of the ladder thus continues until the bed rock is reached. The bed rock, if yielding, is torn loose and brought up until barren of values.

Strong jets of water are introduced to the hopper in which the gravel has been dumped by the buckets in passing over the upper pulley. The mixed gravel and water feed themselves by gravity into a revolving

screen or trommel, where additional water is introduced. This trommel is 12 feet long, 48 inches in diameter, and inclined 3 inches to the foot. The perforations are 1½ inches in size. The larger rocks are separated from the finer gravel and passed out at the lower end of the trommel into the water at the side of the dredge. The finer material drops into a second hopper, which is swung below the water level by chains near the center of the dredge. This hopper is reduced in size and continued in a 15-inch suction to the centrifugal pump. This pump is of the Prescott type and discharges the pulp into the sluice box located on the upper deck. It is run at a speed of 250 revolutions and has a capacity of from 3,000 to 5,000 gallons per minute.

In passing through this centrifugal pump, the gravel undergoes a complete disintegration of any clayey or cement masses contained and effects a freeing of the gold, so that 98 per cent of the value originally contained in the gravel is saved in the sluices.

The dredge is also equipped with a Dean pump of large capacity. This supplies the water to the hoppers and trommel and forces jets of clean water to the bearings within the centrifugal pump to keep them free from gravel and to overcome heating.

There are two sluice boxes. The first originates on the upper deck just back of the pilot house and is 30 feet long, 30 inches wide, and 40 inches deep. It discharges into a lower sluice box, which is 56 feet long, projected beyond the dredge and suspended by cables from an A frame. These sluice boxes are steel and fitted with a false bottom of square steel plates separated some 3 inches, so that the heavier gravel and stones which have been freed of all clinging gold do not come into contact with and cause excessive wear to the riffle boards. The weight of this suspended sluice box on the A frame, when carrying the discharge from the pump, is 36,000 pounds. This sluice at the lower end, where the tailings are abandoned, can be swung laterally by means of cables to deposit these where desired. To overcome the tipping that might be occasioned by this lateral swinging, the dredge is supplied with two boxes, each 42 feet long, 12 feet wide, and 42 inches deep, located lengthwise of the dredge under the lower deck. Water is pumped into the opposite box when it is desired to swing the sluice laterally and overcomes all tendency to tip the dredge.

The *A. F. Graeter* is provided with an electric-light plant, thus enabling operations to be continued at night. Eight men are required to man this dredge during each shift. The cost of working gravel on this dredge, where steam is employed, has been found to be 9 cents per cubic yard. This includes labor, supplies, running repairs, and superintendence. On the *F. L. Graves*, where electricity, generated by water power, is employed, this cost has been 4½ cents per cubic yard.

The dredge that has been built for the Bon Accord Mines, Limited, differs from the *A. F. Graeter* in that the ladder is swung above the upper deck, and the excavated material will be discharged from the

TRACTION DREDGE AND SURROUNDINGS.

DIPPER, CAR, AND INCLINE, TRACTION DREDGE.

buckets into a hopper communicating with the trommel, which is located on the deck. After being agitated with water the pulp will pass into the sluices. This arrangement will obviate the use of the centrifugal pump, and the experiment will be watched with interest. Should sufficient disintegration be accomplished to permit a close saving of the gold, the future will probably witness a general adoption of this more direct delivery to the sluices. On the *F. L. Graves* the gravel, after being washed in the trommel, is raised to the sluice boxes by a second chain of buckets, but the disintegration is imperfect and the loss in gold considerably heavier than on the *A. F. Graeter*. On the Chicago Mining and Developing Company's dredge a sand pump made by the Morris Machine Works is employed for disposing of the gravel to the sluices. This also accomplishes a complete disintegration.

The sluice swinging from the A frame that has been described has not been altogether satisfactory and will be replaced by the boat system employed at the other dredges. In this system the lower sluice is supported by a trestle carried on a barge. Connection is made with the sluice on the dredge by a flexible joint and bridge.

By this lateral system a much longer sluice box can be employed, which is free from the vibration caused by the working of the dredge.

The traction dredge, or land-mining machine, at Washington Gulch has been designed to work in ground that is unusually flat and where but little water is obtainable. It is owned and operated by W. M. Johnston & Co., of Chicago, who also designed the plant. It works dry gravel, and where the machine can not sufficiently clean the bed rock this work is done by hand labor. The entire plant is supported on four bogie trucks, which move on double tracks 12 feet apart laid on the bed rock. No jack arms, side braces, or spuds are used.

Steam is supplied by one 50-horsepower boiler to a set of dredging engines of the same capacity. These perform the excavation, handle the car, run the washer and trommel, and move the plant forward when required.

That part of the machinery by which the excavating is accomplished is similar in design to that used for such purpose on ordinary steam shovels. The boom is 40 feet long and carries a dipper or shovel of 1¼ yards capacity and handles 70 cubic yards per hour. The water supply to this plant for all purposes is 20 miner's inches.

In this gulch the bed rock lies some 16 feet below the surface. Above this is the auriferous gravel, on which is a considerable overburden of barren material. This latter is first stripped off and thrown to one side without washing. The pay gravel is then taken up by the shovel and dumped into a car which runs on an incline at the other side of the plant. One end of this inclination rests on a shoe set in solid ground on the bank of the cut, and the other terminates on the roof of the dredge. The car when filled is hauled up by a cable operated by the engine and dumped into a hopper on top of the plant. The gravel passes into

a washer and trommel, where complete disintegration is effected and the coarse gravel and rocks passed out at the rear end of the plant. The finer gravel, sand, gold, and water pass through the perforations of the trommel into a sluice box originating immediately below. This sluice is continued below the dredge, and equipped at the lower end with chains for regulating the grade. The saving of gold accomplished in this system is 97 per cent or 98 per cent.

Near the end of the sluice box is placed a sand valve which separates the sand and gravel from the water and drops them underneath to form a dam, which prevents the waste water entering the pit in which the plant rests and permits the bed rock to be kept dry.

In this system the tailings are readily disposed of by gravity alone, and this has been accomplished with equal facility whether the dredge has worked on a down, a level, or an up grade.

The machine makes a cut 40 feet across and 16 feet deep, moving itself ahead 7 feet each time when desired. It was operated ten hours every day from May 18, with the exception of Sundays and one day while awaiting material with which to make repairs. Eight, and sometimes nine, men have been employed, three of whom do the work of cleaning the bed rock by hand. About 1½ cords of fir wood are used for fuel during each run of ten hours.

This dredge is the first machine of this design to be constructed; others are being built which will embody improvements that have been suggested by the work done here. There is believed to be ample elasticity in the design of this plant to meet successfully all requirements for working dry ground.

At Virginia City a movable tower has been erected which is 40 feet high, with sluice boxes below. This is guyed with cables, and a cable carrying a huge bucket extends over a considerable area to be worked. An engine located near by, and connected with the bucket by cables, loads this bucket, raises and delivers it to the tower, dumps it, and returns for filling. The gravel, when dumped from the bucket, passes into a sluice box, where it is disposed of and the gold saved.

DETAILS OF TRACTION DREDGE.

GROUND AFTER WORKING BY TRACTION DREDGE.

VII.

NEVADA.

By J. W. ADAMS,

Superintendent of the United States Mint, Carson City, Nev.

Nevada's production of gold and silver for the calendar year 1897 was:

Gold	$3,112,765
Silver (coining value)	1,632,934
Total	4,745,699

Compared with the preceding year (1896), these figures show an increase in gold of $113,223 and in silver of $622,928, an aggregate gain of $736,151.

Lincoln County still maintains its place at the head of the gold-producing counties of the State, its gold product for 1897 being $2,190,760 and silver $240,290, a total of $2,431,050—more than one-half of the entire product of the State. This large output is entirely from the Delamar and April Fool mines at Delamar, Ferguson district.

Eagle district, 30 miles east of Pioche, is attracting considerable attention. The erection of a mill and other improvements are contemplated, and the future of the district is very promising.

Eureka County takes second place, with a product of $912,350. The large increase ($662,992) in the silver product is due to the resumption of operations by the Tenabo Mill and Mining Company (formerly the Cortez, Limited) at Cortez.

The Blair group of mines, at Silver Peak, Esmeralda County, have been involved in litigation, and in consequence have not been operated during the past year, which accounts for the large decrease in the bullion output of this county.

Since my last report the Chainman mine, at Lane City, Ely district, White Pine County, has passed into the hands of wealthy capitalists, who have made extensive and costly improvements to this property, including the erection of a modern mill, cyanide and electric power plant. These improvements having just been completed, it is impossible to get any returns for this year, but the bullion output from this mine for the year 1898 will place it among the leading gold producers of the State. The mines at Cherry Creek district, also in White Pine County, which have not been operated for years, are now being vigorously developed and give promise of becoming paying properties.

Midas, formerly Ione district, in western Nye County, has witnessed a revival of its mining interests. Of the total production, $78,640, reported from Nye County, $60,000 gold product and $6,237 silver was from the Ione Gold Mining Company at Midas. New hoisting works and mills have been built and large sums of money have been expended in improvements and in the development of the gold properties of this district. Considerable prospecting and development work has also been done in Ellworth, Marble Falls, and Lodi districts, and also in the Reese River and Toiyabe ranges of mountains in Nye County, where gold is known to exist.

The cyanide process is becoming a prominent factor in the extraction of the gold and silver contained in the vast amount of tailings that have accumulated in the reduction of the ores from the Comstock lode and other rich mining districts of the State. The product from this process from the tailings of the Comstock lode alone, during the past six months in which the plants have been in operation, amounted to $55,646 gold and $149,330 silver.

The following tables are compiled from the reports received from mining companies, United States mints and assay offices, and the reports of the county auditors to the State comptroller for the four quarters ended December 31, 1897:

PRODUCT OF NEVADA FOR THE YEAR 1897.

County.	Gold.	Silver (coining value).	Total.
Churchill	$1,500.00	$4,000.00	$5,500.00
Douglass	2,800.00	100.00	2,900.00
Elko	141,075.00	25,680.00	166,755.00
Eureka	92,058.00	820,292.00	912,350.00
Esmeralda	142,588.00	4,280.00	146,868.00
Humboldt	33,160.00	4,200.00	37,360.00
Lander	50,046.00	159,860.00	209,906.00
Lincoln	2,190,760.00	240,290.00	2,431,050.00
Lyon	78,144.00	4,253.00	82,397.00
Nye	70,220.00	8,420.00	78,640.00
Storey *a*	280,714.00	346,159.00	626,873.00
Washoe	6,700.00	400.00	7,100.00
White Pine	23,000.00	15,000.00	38,000.00
Total	3,112,765.00	1,632,934.00	4,745,699.00

a $55,646 gold and $149,330 silver, product of tailings, included in total.

ABSTRACT STATEMENT FROM THE QUARTERLY ASSESSMENT ROLLS OF THE PROCEEDS OF THE MINES OF NEVADA FOR THE FOUR QUARTERS ENDED DECEMBER 31, 1897.

County.	Quantity extracted.		Gross yield or value.	Actual cost of—		Actual cost of reduction.		Total cost.
	Tons.	Pounds.		Extracting.	Transportation.	Free milling.	Freiberg process.	
Elko	5,456	740	$106,496.59	$81,932.52	$2,653.85	$23,804.06	.....	$108,390.43
Eureka	15,968	422	438,990.04	230,377.01	12,681.19	.....	$108,117.48	351,175.68
Lander *a*	397	1,091	68,394.37	196,395.73	.....	.....	.....	196,395.73
Lincoln	96,772	428	2,222,850.62	397,082.34	76,579.24	1,432,263.47	.....	1,905,925.05
Lyon	1,272	1,600	20,072.67	14,791.00	466.00	15,652.06	.....	30,909.06
Nye *b*	3,188	470	35,224.00	13,050.74	7,321.15	10,491.66	.....	30,863.55
Storey *c*	15,757	1,900	233,353.61	394,579.06	18,550.82	.....	.....	611,731.63
White Pine *d*	561	680	25,013.00	10,490.00	7,106.00	198,601.75	4,815.00	22,411.00
Total	139,371	7,331	3,150,394.90	1,338,698.40	125,358.25	1,680,813.00	112,932.48	3,257,802.13

a Lander County, quarter ended December 31 estimated.
b Nye County, reports for March, June, and September quarters only.
c Storey County, quarter ended December 31 estimated.
d White Pine County, reports for September quarter only.

SUMMARY FOR THE YEAR 1897.

[Reported to State comptroller by county auditors. Silver computed at market value.]

Items.	Ores.	Tailings.	Total product.
Gross yield or value	$3,150,394.90	$132,285.07	$3,282,679.97
Actual cost of—			
Extracting	1,338,698.40	26,150.78	.....
Transportation	125,358.25	16,639.45	.....
Reduction—			
Free milling	1,680,813.00	78,879.96	.....
Freiberg process	112,932.48	.....	.....
Total cost	3,257,802.13	121,670.19	3,379,472.32

Quantity extracted for four quarters ended December 31, 1897, 139,374 tons and 1,331 pounds; tailings, 42,137 tons; total, 181,511 tons and 1,331 pounds.

RECAPITULATION.

Source of production.	Value.
Product for four quarters ended December 31, 1897, as reported by county auditors and State comptroller	$3,282,679.97
Estimated product for the year, not reported by county auditors to State comptroller	1,463,019.03
Total product	4,745,699.00

The proportion of the gold product from quartz and placer mines and the silver proportion from quartz, lead, and copper ores of this State were as follows:

Metals.	Quartz.	Placer.	Tailings.	Total.
Gold product	$3,010,019.00	$47,100.00	$55,646.00	$3,112,765.00
Silver product (coining value)	1,181,857.00	351,747.00	149,330.00	1,632,934.00
Total product				4,745,699.00

No copper ores reduced during the year 1897, but reduction works have been erected, and product for the year 1898 should be large.

VIII.

NEW MEXICO.

By CORBETT AND WYMAN,

Deming, N. Mex.

During the year 1897 there was a decrease in the production of gold and silver and an increase in lead and copper.

At Pinos Altos the principal mines changed hands about the first of the year, and there has been but little done except development work. The new company are putting down several shafts to a depth of 1,000 feet, and will erect new and extensive works for treating the ore. This camp will probably be a big producer in the near future.

At Hillsboro but little milling has been done during the past year, but new mills are being erected, also a cyanide plant. A company has also been formed to bring water and work the placers near Hillsboro.

A large amount of capital has gone into Cochita district, in Bernalillo County, during the past year, and mills are being put up to treat the ores.

White Oaks district has been at a standstill, waiting the arrival of the railroad which is now building to that place. The prospects are for an increase in the production of gold for the year 1898.

The increase in copper has been due to the resuming of work on the Santa Rita copper mines and the erection of a copper smelter at Copper Flat, Grant County.

The increase in lead has been due to the operation of the smelter at Kelley, Socorro County, and to the opening up of the lead carbonates at Cooks Peak, Grant County. This camp produced about 13,500,000 pounds of lead during the year, and many of the mines are worked only in a small way. The ores are a lead carbonate, and contain from 6 to 10 ounces in silver per ton. They occur in large bodies in lime formation.

The value of gold derived from placer mines in New Mexico during the year 1897 was about $34,000; from zinc cyanide works about $11,580.

The balance of $427,209 was derived from quartz treated in stamp mills and smelters.

The amount of silver derived from lead ores was about 148,922 ounces.

There has been no gold or silver of any amount produced from the copper ores.

Following is a statement of the output of metals in New Mexico. The values are estimated upon the average of New York metal quotations for the year:

STATEMENT OF THE OUTPUT OF METALS, BY COUNTIES, IN NEW MEXICO.

County.	Gold.	Silver (commercial value).	Lead.	Copper.	Total.
Bernalillo	$21,850	$12,940	.....	.....	$34,790
Colfax	95,670	8,960	.....	.....	104,630
Donna Ana	5,340	10,150	$8,670	.....	24,160
Grant	96,057	98,129	369,410	$131,113	694,709
Lincoln	39,580	.....	.....	.....	39,580
Sierra	65,750	45,650	.....	.....	111,400
Santa Fe	20,466	1,250	.....	.....	21,716
Socorro	125,700	86,034	165,882	.....	377,616
Taos	2,376	150	.....	132	2,658
Total	472,789	263,268	543,962	131,245	1,411,259

IX.

OREGON.

By EUGENE B. BRADEN,
Assayer in charge United States assay office, Helena, Mont.

The value of the gold and silver produced in the State of Oregon during the calendar year 1897 was $1,354,593.43 and $109,642.68, respectively. Corresponding values for the year 1896 were $1,290,963.68 and $71,811.37. The increase in gold during 1897 was $63,629.75 and in silver $37,831.21, a total of $101,460.96. The percentages of increase over 1896 were: Gold, 5 per cent; silver, 52½ per cent; total production, 7½ per cent.

The mining of precious metals was confined to two districts. These are comprised in northeastern Oregon and southwestern Oregon. The former lies tributary to the Blue Mountains and includes portions of Baker, Union, and Grant counties. The second region named lies along the Coast Range between the Cascade Range and the Pacific Ocean and north of the Siskiyou Mountains, running east and west near the boundary between Oregon and California. The counties that produce precious metals included in the foregoing limits are Josephine, Jackson, Douglas, Lane, Curry, and Coos. Of these two districts the northeastern is the more important because of a larger output, which originates from both quartz and placer mining. In the southwestern almost the entire output is from placer ground. Only recently have efforts been put forth to develop and work the quartz lodes. Milling machinery is being introduced, and it is safe to predict that the activity manifested in this branch of mining will result in an enlarged yield for southwestern Oregon in the future.

The methods employed to work the quartz and auriferous gravel are those that have been in use for many years. These are the hydraulicking and sluicing of placer diggings and the stamp milling and amalgamation of the free gold in quartz supplemented by concentration on vanners. The concentrates are shipped to various smelters for treatment.

Neither lead nor copper are known and developed in sufficient quantities to be considered commercially profitable as yet. In the vicinity of Coos Bay the mining of coal is an important industry. This yield is forwarded by ships to San Francisco and other markets.

Prospecting is being earnestly prosecuted in both of the mining regions. In the northeastern part of the State the exploitation of many meritorious claims was vigorously prosecuted last year, and a number of new properties are included in the list of producers. Unusual attention is turned to this section, and activity characterizes the entire industry. New machinery is contracted for to work ore heretofore only

under development, and a large and increased output in the future is assured. This section has passed beyond the early stage, where failures are the rule rather than the exception.

It is only recently that any attention has been given to prospecting for quartz lodes in southwestern Oregon. The output from this source last year was very small. Considerable new machinery is being installed, and the future output from veins must necessarily increase.

Owing to the deficient data furnished in previous years by Oregon producers, it is not possible to enter into any extensive comparisons of gains last year in placer or quartz mining. More complete and satisfactory returns of the 1897 product have been received from both smelters and producers, and in future years it is believed that the comparative growth of the several branches of mining in Oregon can be accurately expressed in figures.

NORTHEASTERN OREGON.

Baker County.—This is the largest producer in the State of both gold and silver, and lies in the extreme eastern part of the State, being separated from the Seven Devils country of Idaho by the Snake River. On the northern boundary is the Powder River and on the west and south are the Blue Mountains and the Burnt River Mountains, respectively. The drainage of the country is by the streams named and by the Burnt River flowing through the county. Transportation facilities are furnished by the main line of the Oregon Railway and Navigation Company, which crosses the county diagonally from northwest to southeast, and the Sumpter Valley Railroad extends from Baker City to McEwen.

The output in precious metals by this county in 1897 was: Gold, $796,740.69; silver, $50,088.14; a total of $846,823.83.

The mining districts producing largely last year are centered about Bourne, Clifford, Baker City, Rye Valley, and Connor Creek.

Bourne is the principal quartz mining camp in the county. It is situated on the eastern slope of the Blue Mountains, near the northwestern part of the county. Here are located the mines and concentrating plant of the Eureka and Excelsior Company; also those of the North Pole Mining Company, the Columbia Mining Company, the Chloride Mining Company, and the Maxwell Mining Company. These are thoroughly developed properties from which large yields have been taken. All values obtained are recovered by milling or milling and concentration.

Besides these older and more established producers are many prospects in process of development. New capital under the management of experienced mining men is going into the district, and present appearances indicate an increasing production from this region for the future.

To the south of Bourne, on the eastern slope of the Blue Mountains in Baker County, is the mining camp of Clifford. The production from this camp is also a large one. The principal producer here is the

Bonanza mine, while the output of the Don Juan, Pyx, and Phœnix companies, from their properties and mills, also makes a creditable showing. The Lucky Boy is at present idle. Prospecting is active, and the future development of this class of properties is promised.

In this district some placer mining is done by John Gordon, William Jenkins, and others.

The country tributary to Baker City is characterized by extensive works in both placer and quartz. All of the central portion of Baker County may be included in this district. The best-known property is the Virtue mine, lying some 7 miles east of Baker City.

This is a free-milling quartz property, that has been operated steadily for a number of years. The gross yield has been very large. The Flagstaff is another property lying northeast of Baker City, which had a creditable record as a producer in 1897. To the northwest of Baker City is the Baisley-Elkhorn group, that has yielded large returns for several years. The White Swan, Maxwell, Virginia Consolidated, Never Sweat, and other properties are full of promise for the future. The placer diggings of this section are in the neighborhood of Auburn, on Blue Canyon Creek, and in the vicinity of McEwen in gulches tributary to Sumpter Valley, at Minersville, Union Flat, Carus, Sumpter, and Webfoot Basin.

The Rye Valley district also yields largely in both quartz and placer gold. The principal quartz property is that of the Humboldt Basin Mining Company. The Cincinnati is also a quartz mine from which ore is taken.

The principal placers in the Rye Valley district are those of the Clarks Creek Placer Mining Company, Thomas Littig, and Paul Berthon.

At Connor Creek and Chicken Creek, in the southeastern section of Baker County, gold is found in the placers. These have produced regularly. Near Lookout Mountain, some 12 miles northeast of Express, is the Gallagher group of quartz claims, on which work is being done and from which some gold was taken during the past year.

Grant County.—On the western slope of the Blue Mountains and tributaries are a number of mines in Grant County from which a considerable amount of gold is taken annually. Among these are included some of the leading mines in northeastern Oregon. The production of Grant County in 1897 was, gold, $86,968.74; silver, $4,879.77, making a total of $91,848.51.

The mining done in Grant County is at Susanville, at Granite, and in the Greenhorn Mountains, a short spur of the Blue Mountains. In the Greenhorn Mountains are a number of claims in process of development, of which the annual yield is yet small. At Susanville are the Horace Sloan placers, from which considerable gold has been taken during the past years. The principal quartz development at this point is that of a group of claims consisting of the Poorman, Alta, Blue Jay, and Monumental.

Near Granite is the Red Boy mine, belonging to Tabor and Godfrey.

This is a small fissure vein, carrying high values in gold. The property is equipped with a mill and is regularly yielding a considerable amount. In the Granite district, besides the Red Boy, are the Magnolia, Bellevue, Hunchback, and Oro Fino mines. The placers of the Granite district are numerous. The principal ones are those of Sloan and Haskell.

Near Prairie City are several quartz claims in process of development. These are the High Tariff, Cleveland, and Present Need.

On Canyon Creek, near Canyon City, is placer ground, from which a regular yield is secured.

Union County.—Lying south of the Eagle Mountains, between the Powder and Snake rivers, is a rich mineral district, which constitutes the southeastern part of Union County. The output of gold and silver in 1897 was nearly $250,000, having been as follows: Gold $211,698.71 and silver $36,071.53. Union County is second of the Oregon producers in amount. The largest producer in this county last year was the Cornucopia mine, at Cornucopia. Other producing quartz properties were those of the Sanger, Crystal Palace, and Basin Mining companies. Some placer gold was secured from the diggings about Camp Carson.

SOUTHERN OREGON.

The district known under this title embraces the counties of Josephine, Jackson, Douglas, Coos, Curry, and Lane. Only in the first three counties above named did the 1897 production assume an importance worthy of special mention. The Southern Pacific line from Portland to San Francisco passes through these counties and affords the only convenient means of ingress and egress from this section. Owing to the many mountains and streams which diversify this region mining and agriculture are generally pursued in all parts. The principal drainages are by the Rogue and Umpqua rivers and tributaries.

Gold was discovered on Jackson Creek, in the county of that name, during January, 1852, and since then the region has steadily produced gold from many rich placer diggings. The comparatively low altitude, the equable climate, the fertility of the valleys, and the richness of the streams in gold have made this section prosperous at all times since the first settlement in 1852.

Josephine County.—This county is the largest producer of gold and silver in the Southern Oregon district. The output of gold and silver in 1897 was $132,102.99 and $4,576.36, respectively. The principal centers of mining in the county are the Mount Reuben, Grove Creek, Wolf Creek, Galice Creek, Jump-off-Joe, Dry Diggings, Williams, Kerby, Illinois, Sucker Creek, Althouse, and Waldo districts. The Mount Reuben district is in the northwestern part of Josephine County, about 16 miles from Leland Station. Mount Reuben, from which the district takes its name, is highly mineralized, many small veins and ledges being known. The formation is porphyry. This section is worthy of note because the principal quartz mining of Southern Oregon is being done here. The Ajax is opened by a tunnel and considerable develop-

ment has been done on the property, which is also equipped with an improved Hammond gold mill. The Copper Stain mine and the Sandoz mine are in this district, and both have Tremain mills. Other quartz claims in process of development are the Ramsey, Albany, and Goldbug.

The work done on the quartz lodes has resulted encouragingly to those interested, and is directing general attention to the possibilities of quartz mining in southern Oregon. Placer mining is also followed in the Mount Reuben district, on Whiskey and Reuben creeks.

A review of each of the districts in Josephine County would be a repetition in description of the many placer mines that exist in all parts of the county, together with their equipment of ditches, flumes, sluices, pumps, and machinery. This work has long been one of the leading industries of the county, and so general and complete is the knowledge of the extent and richness of the many auriferous deposits that the returns from operations are as easy of prior calculation as are the results of agriculture and other pursuits.

Jackson and Douglas counties.—The yields of gold and silver by these two counties in 1897 were as follows:

County.	Gold.	Silver.
Jackson	$27,946.20	$1,493.84
Douglas	6,543.25	281.60

In Jackson County these amounts are from the placers of the Gold Hill, Wagner Creek, and Ashland districts. From Douglas County the values have been taken from the placers of the South Umpqua, Cow Creek, Olalla, Dodson, Butte, and Brushy Butte districts.

The tables which follow set forth such facts and figures as have been compiled from information furnished by the Oregon producers, supplemented by returns from the smelters and Government institutions that handled the Oregon product during 1897. They show the actual product from the State by counties, together with its origin and final disposition.

PRODUCTION OF GOLD AND SILVER IN OREGON DURING THE CALENDAR YEAR 1897.

Summary by counties.	Gold.		Silver.		Total.
	Fine ounces.	Value.	Fine ounces.	Value.	
Baker	38,542.331	$796,740.69	38,740.05	$50,088.14	$846,828.83
Douglas	316.530	6,543.25	217.80	281.60	6,824.85
Grant	4,207.113	86,968.74	3,774.20	4,879.77	91,848.51
Jackson	1,351.898	27,946.20	1,155.39	1,493.84	29,440.04
Josephine	6,390.482	132,102.99	3,539.53	4,576.36	136,679.35
Lane	118.000	2,439.28	8.10	10.47	2,449.75
Union	10,240.925	211,698.71	27,899.07	36,071.53	247,770.24
Returns from custom smelters, mints, and assay offices, impossible to classify by *counties*	4,361.179	90,153.57	9,467.55	12,240.87	102,394.44
Total	65,528.458	1,354,593.43	84,801.69	109,642.58	1,484,236.01

BULLION OF OREGON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1897.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Assay offices:					
Helena	2,342.352	$43,578.64	474.95	$552.67	$44,131.31
Boise	30,804.021	573,098.06	7,313.89	8,510.70	581,608.76
Mints:					
Denver	114.438	2,129.08	17.48	20.34	2,149.42
San Francisco	9,600.497	178,613.90	1,779.80	2,071.03	180,684.93
Total	42,861.308	797,419.68	9,586.12	11,154.74	808,574.42

DISPOSITION OF GOLD AND SILVER OF OREGON PRODUCTION DURING THE CALENDAR YEAR 1897.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at United States mints and assay offices	38,575.177	$797,419.68	8,627.51	$11,154.74	$808,574.42
Shipped to custom smelters and refineries by producers	26,953.281	557,173.75	76,174.18	98,487.84	655,661.59
Total	65,528.458	1,354,593.43	84,801.69	109,642.58	1,464,236.01

PRODUCTION OF GOLD AND SILVER IN OREGON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1897.

Origin.	Gold.		Silver.		Grand total.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	17,169.788	$354,931.02	3,908.04	$5,052.82	$359,983.84
Mill bullion	29,586.921	611,615.93	41,301.69	53,400.16	665,016.09
In dry ores and concentrates classed as smelting ores	18,771.749	388,046.48	39,591.96	51,189.60	439,236.08
Total	65,528.458	1,354,593.43	84,801.69	109,642.58	1,464,236.01

TOTAL PRODUCTION OF PRECIOUS METALS IN OREGON DURING THE CALENDAR YEAR 1897.

Description.	Quantity.	Value.
	Fine ounces.	
Gold	65,528.458	$1,354,593.43
Silver (coining rate)	84,801.69	109,642.58
Total production		1,464,236.01

X.

SOUTH APPALACHIAN STATES.

By W. S. CLANTON,

Assayer in charge of the United States assay office at Charlotte, N. C.

The yield of the precious-metal mines of the States of the South Appalachian Range for 1897 was, at coining rates:

Gold	$291,721.30
Silver	1,757.35
Total	293,478.65

A comparison, State by State, expressed in coining rates, is for the years 1896 and 1897:

States.	1896.	1897.
Alabama	$6,699.40	$8,583.37
Georgia	150,080.01	155,071.29
Maryland	1,040.72	365.52
North Carolina	52,047.14	39,097.44
South Carolina	100,714.17	85,923.19
Tennessee	585.83	145.64
Virginia	4,457.48	4,292.20
Total	315,624.75	293,478.65

This comparison shows a decrease in round numbers of $22,000.

A glance will show that in Alabama and Georgia there was an increase; in Maryland, Virginia, North Carolina, South Carolina, and Tennessee, a decrease.

Table A makes a detailed exhibit of the output.

Of silver ores only a few hundred pounds were shipped from the argentiferous zinc-lead mines of Davidson County, N. C. This shipment was for experimental treatment. A small amount of auriferous copper ores were shipped from Cleburne County, Ala.; also from Person County, N. C.; but I could not learn that any effort was made to save the precious-metal contents, which, if taken at any figure, would amount to very little.

In Alabama there was a greater amount of prospecting work done than in many years.

The interest in Georgia was heightened and much speculation has set in. In South Carolina there was a slight change in 1897, while in North Carolina, Virginia, Maryland, and Tennessee there was a backward tendency in operations.

The attitude of mine operators toward processes was not changed either in the way of greater encouragement or of greater discouragement.

The chlorination or other reduction works are: Cyanide plant at the Sawyer-Mann mine, Randolph County, N. C.; chlorination plant at Charlotte, N. C.; chlorination plant at the Haile mine, Lancaster County, S. C.; cyanide plant at the Brewer mine, Chesterfield County, S. C.; cyanide plant at the Currihee mine, Gainesville, Hall County, Ga.; sulphuric acid works, Blacksburg, S. C.; chlorination plant, Creighton mine, Cherokee County, Ga.; chlorination plant, Royal mine, Haralson County, Ga.

Several of these plants—four at least—are in a high state of efficiency and the combined output was about $62,000, being more than one-fifth of the total production of the range.

MARYLAND.

The exhibit for Maryland is shown in Table B.

VIRGINIA.

The exhibit for Virginia is shown in Table C.

There were no changes of importance in the mining conditions of these States in 1897, and none were indicated for 1898.

NORTH CAROLINA.

The yield is shown in Table D.

Most of the counties show a decrease. Of the counties showing an increase the South Mountain section, comprising Burke, McDowell, and Rutherford counties, gained nearly $6,000, and this area bids fair to maintain this lead during 1898. The monazite industry has never recovered from the depressing influences of the heavy importations from Brazil prior to 1897, and hence there was a diversion of the mining population toward the gold deposits. It may be remarked in passing that the mining population is steadily diminishing, and the possibilities of returns from this class of work are also constantly diminishing with the exhaustion of the easily workable areas.

A few running statements will sufficiently describe the status in North Carolina at the present moment.

In Granville and Person counties the copper mines are again receiving attention and some shipments of smelting ores have been made and others will presumably be made in 1898. These ores contain: Gold, $2.07 to $3.72 per ton; silver, $0.65 to $3.93 per ton; total, $7.65 per ton. Copper, 31.14 to 23.08 per cent.

Higher contents are occasionally met with. It is doubtful if the methods of smelting likely to be applied in the immediate future will be effective in adding this small amount to the public stock of gold and silver.

The prospecting of the gold ores about Oxford, Granville County, was quite active and three mines were opened. I should not judge that they were in a condition to make any production of importance in 1898. The main effort was directed to the Granville Gold Estates Company, 4 miles east of Oxford.

Some unusual activity was observed in Guilford, Randolph, Gaston, and Swain counties; the Catawba mine, in Gaston County, was operated the greater part of the year.

A milling plant was erected at Warne, Clay County, and a dredging plant is in process of installation at Irvindale, near Andrews, Cherokee County, for working the river bottoms of Valley River. For a description of these deposits the reader is referred to the report for 1895, p. 99.

The following mines may be mentioned: Spencer, Randolph County; Troutman, McMakin, Isenhour, and Cunningham (near Gold Hill), Reeves, Russell, and Sam Christian, Montgomery County; Scott's Hill, Burke County; the Louder, Parker, Nugget, and Duke, Stanly County, and the Oak Hill, Guilford County.

I have observed no indications of greater activity for 1898.

SOUTH CAROLINA.

The production of South Carolina, by counties, is shown in Table E.

The production of Lancaster, covering the greater part of the production of the State, was substantially the same as in 1896; the reduced yield in Chesterfield, Spartanburg, Union, and York very nearly accounts for the decreased yield for the State.

I have nothing new to report respecting the Haile mine, in Lancaster County, for the conditions of work are settled and permanent, and while each year sees some improvement in the modes and many economies effected, which make the returns larger, no radical departure from the approved milling and chlorination work has been made, and is not likely to be made for the present. The recent underground work has given the mine several years' supply of ore.

The Blackmon mine, in Lancaster County, 12 miles northeast of Lancaster, which was worked somewhat desultorily for two years, has now become a large producer. The shaft is down 155 feet, and at 95 feet levels have been driven 125 feet either way.

The ore body is large, but of low grade. It is equipped with five stamps, and five more are to be added.

The famous Brewer mine, in Chesterfield, was practically idle the whole year, and there is no prospect for its revival in 1898.

The Carolina Sulphuric Acid Works, at Blacksburg, were closed early in 1897.

I am not aware that any change is probable in the mining condition of the State for 1898, either for better or for worse.

GEORGIA.

The production of Georgia, by counties, is shown in Table F.

A more general statement about this State is proper, both because it is now receiving by far the larger attention of the mining public and a larger investment of capital. It is now yielding more than one-half of the entire amount of the Appalachian slope, and the continuous increase in yield for some years has been notable. The investments now being made at several points and the increased efficiency of the larger mines point to a larger output for 1898.[1] The movement in 1896 was almost entirely legitimate, but, as always happens in a prosperous mining section, the healthy expansion is sooner or later accompanied by an unhealthy development on parallel lines, and this State, during 1897, perfectly illustrated this undesirable growth. A number of rash and purely speculative enterprises were set on foot, and many of them speedily came to grief. The speculative tendency is stronger than it was twelve months ago; but out of the whole movement has come some satisfactory successes, and others will probably follow.

Cherokee and Lumpkin counties, the two largest producers, maintained their position.

A brief comparison of the productive areas of the State shows the following changes: McDuffie County, hitherto a very large producer, sank very low in 1897; Haralson quadrupled its yield; White County increased its output, and Oglethorpe, for the first time in many years, became a considerable producer; the petty mining work of the whole State was greatly diminished.

The "river mining" on the Chestatee and adjacent bottoms and on the Chattahoochee River opposite the Forsyth County bank was somewhat diminished, owing to the burning of one of the dredges at Newbridge, Lumpkin County. It can hardly have amounted to more than $6,000. A new dredge replacing the one burned has been built, and another dredge on the Chattahoochee opposite the White County bank. The yield from this class of mining will probably be considerably increased. The greatest activity was shown in Carroll, Cherokee, Hall, Haralson, Lumpkin, and White counties.

In White County the mines at work are the Loud, Hamby Mountain, St. George, the Plattsburg, and the Chattahoochee.

In Lumpkin County the following mines are in operation: Barlow, Ralston, Calhoun, Gordon, Wells, Findly, Hand, Lockhart, Preacher, Crown Mountain, Mary Henry, Yahoola, Hedwig, Kentucky, Betz, and Tahloneka (formerly Singleton).

In Hall County the Currihee mine is in condition to do a large amount of work, unless the ore proves untractable, or the method (cyaniding) unsuitable. The McCluskey mine, 5 miles west of Gainesville, was a small producer.

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[1] The production of Georgia for the first three months of 1898 was about 10 per cent in excess of the production of the like period in 1897.

In Forsyth County the Charles mine was operated a short time in the early part of the year, and considerable desultory work was done at the Sawnee Mountain, 5 miles northwest of Cumming.

The construction of a steam dredge has already been alluded to.

At the Gold Hill mine, near Buford, Gwinnett County, considerable work has been done, and in the same neighborhood other properties have been prospected.

In Milton County only petty work was done.

In Paulding County several properties were examined, while the Yorkville Mining Company, after a very heavy outlay, went into the hands of a receiver.

Considerable work is being done in Carroll County, near Villa Rica, chiefly at the property which was formerly known as the Hill mine; the new shaft of this mine is now down 100 feet. At the Mineral Hill mine, near by, much more work has been done. This property has two veins of good width and with remarkably prominent outcrops; the system of veins has been prospected for 3 miles in length.

The work of the present operator consists of exploration only; no reducing machinery has yet been erected; this part of the lead has been sunk upon at four points over a distance of about 800 feet, the deepest shaft being 140 feet deep.

The ore is a compact iron and copper pyrite and is said to carry nickel; if the entire contents of the vein should correspond to the ore on the dump, the only rational treatment would necessarily be by smelting. It is impossible for your compiler at this point to speak of average values here. One other point in this county should be noted: The old and noted Z. Bonner mine, near Bowden, and quite near to the Alabama line. It is reported to be in condition for productive work in 1898. Nevertheless, the production of this county is not likely to be large in the immediate future.

In Union County, 18 miles from the town of Blue Ridge, the Hart mine has recently been prospected. This belt is the continuation of the belt of Cherokee County, N. C.

Mining in the south part of Bartow County was continuous during the year, but very desultory.

At the Wilkes mine, in Meriwether County, very little was done, though the mine was worked by fits and starts during a considerable part of the year.

Cherokee County was considerably the largest producer of the State, a production most largely due to the Creighton mine. This mine is well developed and in a condition to make a steady return for a long time to come, as the exploratory work is far in advance of the present needs of the milling and chlorination plant. The old Cherokee mine, 6 miles southwest of Canton, has lately passed into the hands of parties who will probably place it in the ranks of large producers. The surface of this property is covered to a depth of several feet with "pay dirt" well

suited to hydraulic operations. There are believed to be fine veins on this property, some of them of considerable width.

At none of the other mines in this county was any work of importance done, though there are fifteen or twenty well-known and believed to have large bodies of ore.

In Haralson County is the well-known Royal mine, which in 1897 came into prominence as a large producer, increasing its yield nearly fourfold. The advanced state of the underground work makes it reasonably certain that it will continue to be a large producer in the immediate future. The success of this property has stimulated effort at other points in this county.

The work in Georgia will probably advance in 1898.

ALABAMA.

The production was larger than in 1896, but did not justify the expectations stimulated by the amount of work undertaken. The result is shown in Table G.

A few cursory notes will indicate the present and prospective condition of the precious-metal mining.

It may properly be stated at the outset that the enormous development of the iron and coal mines has drawn the attention of mining men almost exclusively to those branches of mining industry, and only the remnant of such energy has been devoted to gold mining.

In Cleburne County the Arbacoochee district has been worked in a desultory manner in many places, but in no one was there any yield of importance. Large tracts of placer lands have changed hands, but no extended work has yet been planned. The Hicks-Wise (Hicks-Wyse) has received some attention, as has also the Echols, near Arbacoochee.

The Dick Woods copper mine has been reopened to a depth of 120 feet and a body of copper ore of considerable thickness uncovered. This is reported to be primarily a copper ore, though it carries a little gold and silver. Being a smelting ore, it is not probable at present to add anything to the metallic currency of the country, as its tenor in gold and silver is not great. The Eudora mine, near Bledson's Mills, the Annie Howe, and the Lucky Joe have been slightly prospected; the same statement may be made respecting the Bennett, the Klondike, and the Peruvian mines, near Edwardsville.

The Blue Hill mine, near Dadesville, Tallapoosa County, was worked a considerable part of the year. Nothing of importance was done at the Hog Mountain and Uhlrig, in this county, but some prospecting work was carried on most of the year.

The Aughey, near the central east part of Clay County, was reopened.

The greater part of the mining work has practically been done at the Pinetucky, in Randolph County, near the Cleburne County line and about 7 miles southwest from Arbacoochee, and at the Franklin mine, *Idaho, Clay County*, at which is a stamp and a Huntington mill. The *near-by Ivy* (Hollingsworth or Watts), was also a producer

Practically the greater part of the gold came from the Franklin, Ivy, Pinetucky, and Blue Hill mines.

There is no indication of better results for 1898.

TENNESSEE.

The result of the mining work in this State, which is wholly embraced in the Coker Creek neighborhood, Monroe County, is shown in Table H.

Considerable prospecting was done by four companies—the Cooper Mining Company, the Empire Mining Company, the Coker Creek Mining Company, and the Eureka Mining Company. The latter company sank a shaft in 1897, reported to be 125 feet deep. I was unable to learn of any millwork done during the year. The gold obtained was by small parties working at odd moments.

There is no promise of anything important for 1898.

PRODUCTION OF GOLD AND SILVER IN THE STATES OF THE SOUTH APPALACHIAN RANGE IN 1897.

TABLE A.

States.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Alabama	408.994	99.55	$8,454.66	$128.71	$8,583.37
Georgia	7,460.528	656.24	154,222.81	848.48	155,071.29
Maryland	17.603	1.26	363.89	1.63	365.52
North Carolina	1,869.513	348.95	38,646.28	451.16	39,097.44
South Carolina	4,141.328	243.13	85,608.85	314.34	85,923.19
Virginia	207.039	9.54	4,279.87	12.33	4,292.20
Tennessee	7.012	.54	144.94	.70	145.64
Total	14,112.017	1,359.21	291,721.30	1,757.35	293,478.65

TABLE B.—MARYLAND.

Counties.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Montgomery	17.603	1.26	$363.89	$1.63	$365.52

TABLE C.—VIRGINIA.

Goochland	15.332	1.06	$316.93	$1.37	$318.30
Louisa	57.722	4.05	1,193.23	5.24	1,198.47
Miscellaneous	133.985	4.43	2,769.71	5.72	2,775.43
Total	207.039	9.54	4,279.87	12.33	4,292.20

TABLE D.—NORTH CAROLINA.

Burke	554.707	98.74	$11,466.80	$127.66	$11,594.46
Cabarrus	111.228	18.62	2,299.29	24.08	2,323.37
Caldwell	51.277	8.30	1,059.99	10.73	1,070.72
Catawba	20.589	5.33	425.63	6.89	432.52
Chatham	.509	.09	10.49	.11	10.60
Cherokee	84.750	7.45	1,751.94	9.63	1,761.57

PRODUCTION OF GOLD AND SILVER IN THE STATES OF THE SOUTH APPALACHIAN RANGE IN 1897—Continued.

TABLE D.—NORTH CAROLINA—Continued.

Counties.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Franklin	149.856	10.31	$3,097.80	$13.34	$3,111.14
Gaston	132.378	30.44	2,736.49	39.35	2,775.84
Graham	4.419	.39	91.36	.50	91.86
Granville	2.168	.22	44.81	.30	45.11
Guilford	9.987	2.74	206.45	3.55	210.00
Iredell	1.507	.08	31.15	.10	31.25
Lincoln	2.861	.18	59.15	.23	59.38
McDowell	67.992	15.15	1,405.53	19.59	1,425.12
Mecklenburg	89.481	21.89	1,849.74	28.30	1,878.04
Montgomery	66.395	16.43	1,372.50	21.24	1,393.74
Moore	42.283	11.81	874.07	15.27	889.34
Polk	25.820	3.17	533.75	4.09	537.84
Randolph	68.959	21.11	1,425.50	27.29	1,452.79
Rowan	70.789	8.79	1,463.34	11.37	1,474.71
Rutherford	95.904	15.25	1,982.51	19.72	2,002.23
Stanly	147.087	20.30	3,040.56	26.24	3,066.80
Union	23.203	6.24	479.65	8.06	487.71
Watauga	.446	.08	9.23	.10	9.33
Miscellaneous	44.918	25.84	928.55	33.42	961.97
Total	1,869.513	348.95	38,646.28	451.16	39,097.44

TABLE E.—SOUTH CAROLINA.

Abbeville	19.333	6.34	$399.64	$8.19	$407.83
Anderson	.773	.17	15.99	.22	16.21
Chesterfield	56.863	4.36	1,175.47	5.64	1,181.11
Kershaw	7.346	.66	151.86	.85	152.71
Lancaster	3,807.441	172.38	78,706.79	222.87	78,929.66
Spartanburg	103.277	33.20	2,134.92	42.93	2,177.85
Union	127.762	22.10	2,641.07	28.58	2,669.65
York	18.533	3.92	383.11	5.06	388.17
Total	4,141.328	243.13	85,608.85	314.34	85,923.19

TABLE F.—GEORGIA.

Bartow	12.215	1.22	$252.51	$1.58	$254.09
Carroll	101.798	26.45	2,104.36	34.20	2,138.56
Cherokee	2,362.381	13.18	48,834.76	17.04	48,851.80
Cobb	27.581	1.26	570.17	1.63	571.80
Dawson	93.869	7.68	1,940.45	9.92	1,950.37
Forsyth	72.410	9.08	1,496.86	11.75	1,508.61
Habersham	9.608	3.73	198.62	4.82	203.44
Hall	68.539	18.66	1,416.82	24.12	1,440.94
Haralson	1,190.633	191.39	24,612.55	247.45	24,860.00
Lumpkin	2,142.358	212.90	44,286.47	275.27	44,561.74
McDuffie	221.727	42.62	4,583.49	55.11	4,638.60
Meriwether	23.474	.76	485.24	.98	486.22
Milton	24.619	.59	508.91	.77	509.68
Oglethorpe	61.187	2.65	1,264.86	3.43	1,268.29
Rabun	105.137	2.46	2,173.38	3.18	2,176.56

PRODUCTION OF GOLD AND SILVER IN THE STATES OF THE SOUTH APPALACHIAN RANGE IN 1897—Continued.

TABLE F.—GEORGIA—Continued.

Counties.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
White	709.286	78.16	$14,662.24	$101.05	$14,763.29
Miscellaneous	233.706	43.45	4,831.12	56.18	4,887.30
Total	7,460.528	656.24	154,222.81	848.48	155,071.29

TABLE G.—ALABAMA.

Clay	124.473	26.02	$2,573.07	$33.64	$2,606.71
Cleburne	8.517	2.57	176.08	3.33	179.41
Randolph	27.453	6.46	567.50	8.35	575.85
Tallapoosa	211.487	57.05	4,371.83	73.76	4,445.59
Miscellaneous	37.064	7.45	766.18	9.63	775.81
Total	408.994	99.55	8,454.66	128.71	8,583.37

TABLE H.—TENNESSEE.

Monroe	7.012	0.54	$144.94	$0.70	$145.64

XI.

SOUTH DAKOTA.

By FRANKLIN R. CARPENTER,
Deadwood, S. Dak.

The output of precious metals for the State of South Dakota for the year 1897 was: Silver, $80,641.88; gold, $5,631,237.33.

BLACK HILLS PRODUCTION.

Metals.	Ounces.	Value.
Gold	135,586.87	$5,631,237.33
Silver*	146,621.59	80,641.88
Total value		5,711,879.21

* This silver is at commercial value (55 cents per ounce), and equals 146,622 fine ounces.

The relative proportions of the precious metals gotten from various ores were as follows:

Items.	Silver.		Gold.
	Weight.	Value.	
	Ounces.		
From free-milling quartz ore	40,000	$22,000.00	$3,434,766.33
From refractory ore	106,621.60	58,641.88	2,194,861.00
From placer mining			1,610.00
Total	146,621.60	80,641.88	5,631,237.33

GOLD MINING IN THE BLACK HILLS.

For many years before the settlement of the Black Hills there were many stories current among the frontiersmen of the West of the vast deposits of gold existing therein. These stories are now known to have been largely mythical, or, at best, based upon a very slender thread of truth. The only one containing any basis of fact that I have ever been able to discover was the statement of Father De Smet to General Sheridan to the effect that he had seen gold nuggets among the Sioux Indians, among whom he had long resided as a missionary. The first real information concerning the geology and structure of the Black Hills was set forth by Dr. Hayden, in March, 1858, before the Philadelphia Academy of Sciences, and again, in 1861, in which he correctly outlined the main points in the geological history of the Black Hills.

In 1874 Custer made his famous expedition into the Hills. He was accompanied by N. H. Winchell, as geologist. This expedition first made known definitely the existence of gold in the Black Hills, and there was a very generally expressed wish that the Government would buy the Hills from the Sioux, to whom it had been secured as a reservation. In order to arrive at some idea of its value another exploring party was sent to the Hills. W. P. Jenney and Mr. Henry Newton, young graduates of the Columbia School of Mines, were appointed geologists and Dr. V. T. McGillicuddy topographer. The geological work done by this expedition was very noticeable, both as to quality and quantity, when the short time in which they were here is considered. Dr. McGillicuddy's map and Mr. Newton's geological report have been the actual basis of nearly all geological reports and maps of the Hills made since then. They found gold at various points throughout the Hills, but the main deposits, and those upon which the fame of the Hills exists, were not found by them, nor indeed until after many other sections had been located by the rush of prospectors that followed the publication of Dr. Jenney's report.

The Homestake deposit was found April, 1876, by two French boys, Moses and Frederick Manuel, and during the same month the Old Abe and Terra were located by the Manuel brothers, Alex. Eng, and Henry Harney, and the first sale of ground was made to Mr. Hiram B. Young, who is still a resident of Deadwood. Later in the year the Highland mine and the Homestake No. 2 were located by Thomas Mallory and the Golden Star by "Smoky" Jones. When the Golden Star mine was recorded, it is a matter of history that only one prospector interested was able to pay his proportion of the recorder's fee; and yet, within a year one of the claims was sold for $30,000, and a little later another for $58,000, still another for $110,000, and another for $165,000. These claims constitute the main portions of what is known as the "belt," and are all comprised within an area 5,000 feet long and 2,000 feet wide and comprise to-day the really productive claims of the belt. Large as the above figures seem, they were not extravagant prices for the prospectors' rights when it is remembered that they have produced about $60,000,000 and at the present writing $75,000,000 are believed to be "in sight." This vast sum of money has been taken from ore of an average value of about $4 per ton, and is to-day the main support of the people of the Black Hills.

Geology, etc.—The Black Hills have been compared to a wooded island rising in a treeless plain. The entire uplift is about the size of the State of Connecticut. In the Cambrian time of the geologist it formed a slowly sinking island of slates and schists in the encroaching ocean. These slates and schists were the so-called Algonkian rocks and had been folded upon each other, twisted and contorted, and metamorphosed to their now present condition. This is shown by the state of the fragments found in the base of the Cambrian. They are metamorphosed

to the exact condition of the underlying slates and show that no change has occurred in their condition since they were broken off in Cambrian time. It is the base of this Cambrian that forms the so-called cement deposits of the Black Hills. They have been not inaptly termed "fossil placers."

The Homestake gold vein and other slate deposits of like character were already formed and in place. Upon this sinking island the Cambrian sea advanced, undermining its cliffs, grinding the material to bowlders, to sand, and to powder, sorting over the débris thus formed, and, with that brought down by the rivers from the hills, forming the first or lower member of the Cambrian here represented. The island sank beneath the waves, and over the top were laid down all rocks of succeeding ages in turn, until the close of the Cretaceous Age, when there began a motion in the opposite direction, which culminated in the present uplift in the hills. This, in the northern end of the uplift, was accompanied by a vast outpouring of lava (porphyries).

In after ages the crown of the uplift was eroded and the original slate area again laid bare, and in turn deeply eroded. In a former paper (Preliminary Report of the Dakota School of Mines upon the Geology and Mineral Sources of the Black Hills, 1888) I have described the Homestake deposit as a vast bedded slate deposit, forming an independent member of the slate series of the Black Hills, identical in many respects with the great Rammelsberg vein in the Hartz Mountains, which is described as forming an independent member of the Goslar slates. Further investigation, however, has convinced me that the analogy is nowhere nearly so close as I at one time thought. I am now inclined to consider it as analogous to the so-called "saddle deposits," formed in the folding and metamorphosing of the schists and slates; but, unlike the "saddle deposits," it is an anticline instead of a syncline. The outcrop of the deposit is nearly a mile in length, and the so-called east and west veins are, in my opinion, merely the two edges of a very sharp syncline which come together in the deeper workings. The syncline as a whole dips from the surface at an angle of thirty-five or forty degrees. The depth at which it will prove remunerative is, in my opinion, limited only by the engineering difficulties of pumping and hoisting and of milling, which all increase with depth.

The reason for the increase of the first two is self-evident. The difficulties in milling have increased with depth, owing to the presence of gold-bearing sulphides. The gross value per ton has probably not declined. The outcrop of the vein was wholly oxidized, and yielded nearly all of its gold contents readily to simple amalgamation.

The deeper workings of the vein are still singularly free-milling. This is because part of the gold has always existed "free," and this condition, I do not hesitate to predict, will continue indefinitely and will form the larger percentage of the gold existing in the deposit. The iron pyrite, however, accompanying the free gold also carries a value. This pyrite is seldom or never massive, but exists in disseminated crystals

throughout the deposit, and a large number of experiments are now being carried on to determine the best method of treatment. At present this pyrite is recovered by concentration and is sold to the Deadwood and Delaware Smelting Company. Owing, however, to the great loss in concentration and the low value of the recovered pyrite, the present method leaves much to be desired. A solution of the difficulties is expected to be found in the cyanide process.

During the past year Mr. Thomas J. Grier, the able superintendent and general manager of the company, has studied, with the greatest profit to the company, the action of the temperature of the water during amalgamation. This is a matter, as will be seen later, of the utmost importance to free-milling gold miners, and too wide a publicity of the results can not be made.

Some months ago he informed me that the output of gold at the Homestake had been very greatly increased by cooling the water used in the stamp-mill batteries. Two batteries side by side were run upon the same ore, the one with a temperature of about 50° F. and the other at a higher temperature. The increase in the amount of gold recovered from the cooler battery was something startling. It was supposed that more fine gold amalgamated at the lower temperature, the coarse gold not being lost at any temperature. Mr. Grier also authorized me to announce the fact to the mining profession, which, after some time spent in the study of the real reason for the increased yield, I did, and the information so furnished was embodied in an editorial by Mr. Richard P. Rothwell and published in the Engineering and Mining Journal of January 29, 1898, together with much additional information upon the subject by Mr. Rothwell, which resulted in a discussion that has been of the utmost benefit to mill men.

I stated the case as given me by Mr. Grier to many chemists and engineers. The prevailing opinion seemed to be that at a lower temperature there was either less oxidation of the mercury or less decomposition of the iron pyrite or other minerals present to foul the mercury, either of which would have interfered more or less with the amalgamation of the fine gold. Dr. H. O. Hofman, associate professor of mining and metallurgy of the Massachusetts Institute of Technology, suggested that perhaps in the warming of the water by the waste steam, as had been the former custom, small particles of oil from the engines were carried through to the batteries and thus interfered with the amalgamation. This view seemed so reasonable that I asked Mr. Allan J. Clark, the Homestake chemist, to investigate the matter for me, which he did, and the following is his letter in full:

LEAD CITY, S. DAK., *January 15, 1898.*

DR. FRANKLIN R. CARPENTER,
Deadwood, S. Dak.

DEAR SIR: In accordance with my promise of yesterday, I have looked into the question raised by Dr. Hofman. The result of my inquiries is as follows:

First. The mill water, while the higher temperature was used, was never in con*tact with any oil* or grease. The steam from the cylinders was passed through a

series of pipes, with which the mill water was held in contact for a period of time sufficient to give the desired temperature. The condensed steam was discarded The Wheeler condenser is, I believe, the style used.

Second. The treatment at present is precisely similar, but the contact is of shorter duration.

During the summer recently past the following facts came under my personal observation:

In the Golden Star mill the water of a single battery was cooled by contact with pipes containing a freezing mixture (of which I do not know the precise nature) placed immediately below the first row of plates. The water on the second row of plates was about 10° F. below that of the adjacent plates, presumably receiving the same quality of ore. The recovery of amalgam was decidedly better than from the other plates.

In the Highland Plate House (third row plates) the recovery of amalgam would diminish during a period of warm weather, and for perhaps twenty-four hours after.

The following explanation has been recently forming in my mind, being suggested by the properties exhibited by the amalgam from the silver plates, more especially by that from the third row, as contrasted with that from the first row (copper) plates.

On the plates this amalgam is softer than that of the first row; it rarely retorts over 20 to 22 per cent, as against 35 to 37 per cent, and after standing for some time after squeezing, it assumes a more or less liquid condition, the material collected during two weeks after coming down to the assay office for retorting being fully 75 per cent in liquid form, with a few pasty lumps included in it. Moreover, this condition has not been so noticeable during the last few months as it was during the summer and autumn.

May we not look to mechanical causes for the explanation? Might it not be that the colder water, by hardening or stiffening this amalgam, prevents scouring and so gives higher results?

I put this question to Mr. Read, the amalgamator at the Golden Star Mill, and he tells me that he has been thinking of the possibility and is inclined to set it before any chemical explanation. He cited the following observations recently made by himself:

A battery had been worked for some time on water at 56° F. Before leaving the mill one evening, he changed to 70° F.; at this time the plates were well covered with amalgam.

Next morning at 7 o'clock much of this had washed off, small ridges remaining where the brushes had broken the even surface of the amalgam; at 11 a. m. these had disappeared and the plates were almost bare.

This was a silver plate; the copper plates of the first row show no such changes in working when the temperature is varied. Mr. Read adds that he has only occasionally observed any evidence of chemical action when using warmer water—a black scum showing on the surface of the plate when it is gently rubbed with the hand.

This is about all the information I can add to that which you already have upon the subject. I trust it may help you to answer the question.

I am, yours, truly,

ALLAN J. CLARK.

Now, while the fluidity of the amalgam is largely dependent upon the quantity of mercury used, there is no doubt in my mind but that Mr. Clark has given one, if not the real, reason. Bearing upon this question, I quote the following from Mr. Louis Jannin, jr., whose paper upon "The amalgamation of free-milling gold ores" can be found in the Mineral Industry, Vol. III:

Some mill men believe in heating the battery water, but it would seem doubtful if *this can produce any result* other than to create a fluid amalgam. The plates in

particular are softer when warm water is used; but this is a doubtful advantage. If the water be heated at all it should not be done by the direct application of exhaust steam, as is explained elsewhere.

A peculiarity of the amalgam is that it contains more gold in winter than in summer. This is due, undoubtedly, to the warmer water in summer, making the amalgam more fluid. The difference ordinarily is slight. Amalgam that retorts 40 per cent in summer may retort 45 per cent in winter.

Mr. Grier's discovery at the Homestake is very suggestive, and there may be after all some other solution. The affinity of mercury for gold may be greatest at some particular point of temperature. This may be at the point here found or one may suppose the affinity is greater at higher temperatures, but that it is more than offset by the losses of the softer amalgam. It might be advisable if so to use a higher temperature in the batteries, but to pass the water on leaving the batteries over cool plates. This might be accomplished by putting a freezing mixture beneath the apron plates. The hard amalgam would be less easily scoured off of the plates than the softer.

The main fact, however, to be noted, regardless of its actual cause, is this: Water at 50° temperature gives a greater yield of gold than water at 60°, or at higher temperatures, the net saving at the Homestake from this and other improvements introduced by Mr. Grier, if stated in figures, would almost surpass belief, some evidence of which may be found in the fact that the Homestake dividends have of late more than doubled.

Other deposits.—Resting upon the basal quartzite of the Cambrian are found certain ore deposits known as the "flat deposits." These are impregnations in the Cambrian rocks and are locally called "shoots."

They are highly siliceous, are usually about 50 feet in width, 10 feet high, and of great longitudinal extent. They average about $15 in gold and 2 ounces in silver per ton. The economical beneficiation of these ores had long been a problem. Owing to the entire absence of fluxing ores in the hills they could not be smelted by ordinary processes. The gold contents was invariably combined with tellurium, and hence they were not free milling. Three processes, however, have been found by which they have been rendered profitable.

The Deadwood and Delaware Smelting Company smelts them with limestone and iron pyrite, and forms a matte which is shipped to outside smelters for further treatment. The Golden Reward Mining Company roasts the ores, treats them with chlorine in a revolving barrel, and recovers a large percentage of the gold, but of course loses the silver. Mr. D. C. Boley at his mill crushes the ore, gives it a partial roast, and treats it with a solution of cyanide of potassium. All three processes are fairly successful, and the amount of gold recovered by the companies working these deposits for the year 1897 exceeds $2,100,000.

There is a deposit of gold-bearing slates, similar in many respects to *the Homestake*, located in Pennington County, which is being devel-

oped and may be expected in the near future to become a profitable gold producer. I do not, however, count upon any very great increase in gold from the Black Hills in the very near future. The chances of new discoveries in a small area like this are very remote, as the country has been pretty thoroughly prospected. I do not know that we have reached our maximum output, but any increase hereafter must come from the enlarged working of present known deposits. I am under the impression that the slate deposits, like those of the Homestake, known to exist in various portions of the hills are capable of further development. They do not carry the same percentage of free gold as the Homestake, but many of them carry an equal amount in connection with their sulphide contents. It is to these deposits that we must look for any further increase in the output. Some of them, I am satisfied, will justify development and the erection of mills, but in order to be profitable the example of the Homestake must be followed and works of enormous magnitude constructed. In the expressive language of the miner, they are not in any sense "poor men's mines."

XII.

UTAH.

By EUGENE B. BRADEN,
Assayer in charge, United States assay office, Helena, Mont.

Utah's production of precious metals in 1897 was $13,647,764.34. This is the total value of the gold, silver, copper, and lead outputs by the mines of the State in the quantities and amounts indicated below:

Metal, customary measures.	Quantity.	Value.
Gold (fine ounces, at $20.67+)	89,297.363	$1,845,938.25
Silver (fine ounces, at $1.29+)	6,689,753.85	8,649,378.71
Copper (pounds, at $11.30 per cwt.)	3,854,821	435,594.77
Lead (pounds, at $3.60 per cwt.)	75,468,128	2,716,852.61
Total value of production		13,647,764.34

Compared with the yields in the preceding year, the following increases and decreases may be noted:

Metal.	1896.		1897.		
Gold ... fine ounces	92,044	$1,902,718	89,297	$1,845,938	*a* $56,780
Silver ... do	8,250,233	10,666,726	6,689,754	8,649,378	*a* 2,017,348
Copper ... pounds	3,561,860	389,133	3,854,821	435,595	*b* 46,462
Lead ... do	73,430,060	2,184,544	75,468,128	2,716,853	*b* 532,309
Total		15,143,121		13,647,764	*c* 1,495,357

a Decrease. *b* Increase. *c* Net decrease.

For some years the growth of the mining industry in Utah has been steady and permanent and many attractive features are presented.

Until recently the more important development has been along the lines of lead and silver-lead mining, in which the greatest profit was offered by the then existing and proven methods for successful treatment. During 1897 the adaptation of the cyanide process has been made to treat the large low-grade bodies of gold ore.

Utah takes rank with Montana and Colorado in the extensive development of its many larger properties, the employment of modern

methods for treatment and facilities for transportation. The immense production of precious metals in this State is nearly all from developed properties at those points having railroad facilities. Among these districts are the famous Tintic, Mercur, Frisco, and the districts closely tributary to Salt Lake City, including Bingham, Park City, and the Cottonwood. Prospecting is still active in all sections of the State, and, judging the future from the past, there are no reasons why the Tintic or the Mercur will not be rivaled by others equally great. The Deep Creek, Fish Springs, Stateline, Blue Mountain, and other districts afford indications of future importance and production.

In Utah exceptional facilities are offered for the treatment and sale of the mining product. In the vicinity of Salt Lake City are the smelters of the Pennsylvania, Germania, and Hanauer companies. The Taylor and Brunton, the Conklin, and the Pioneer Sampling Works at Salt Lake City also afford a ready market for all the product offered.

The tables presented herewith have been prepared from information possessed by the Government mints and assay offices and data furnished by the smelting and refining companies. These results have been verified by returns received from the companies and the individuals owning or leasing the mines actually producing. Care has been taken to avoid duplications in the compilation of totals, and it is believed that if any error has occurred in this connection it has been on the side of accuracy and positive production rather than on that of doubtful increase.

The production of gold comes from Juab, Tooele, Salt Lake, Summit, Iron, and Beaver counties, in the order of importance named. This amounted to 89,297.263 fine ounces, valued at $1,845,938.25. About 40 per cent of this entire yield is the product of gold mills at Mercur and elsewhere, where the cyanide process is employed to extract the values. The balance was contained in the smelting ores from the Tintic and other sections. There was little or no gold recovered by stamp milling or placer mining. However, Bingham Canyon, near Bingham, in Salt Lake County, has been the scene of extensive placer operations in the past year.

The installation of cyanide mills has brought a new era into the gold-mining industry. These gold camps are increasing in number and promise to take rank with the progressive silver districts of former years. The depreciation of silver turned the attention of miners to gold, and the discoveries so far made give assurance that in future these two metals will vie with each other in importance. It is but a few years since Utah had no purely gold camp. At Mercur one of the largest known gold-bearing deposits in the world is well developed to commence production. This is equipped with one of the largest and most complete cyanide plants in the United States.

For many years silver was the leading branch of mining. The search for this metal commenced over thirty years ago, and since then many

mines have been opened in the State which became famous, paid princely fortunes in dividends, and finally passed into obscurity.

The Ontario, at Park City, has been the largest and the last of the great silver mines to close down. This was early in 1897. The Ontario has paid $13,000,000 in dividends to date. More recently, however, than the closing of the Ontario and other mines there has come a renewed activity. Improved appliances for general mining have been introduced, while a reduction in freight rates and treatment charges offer encouragement to this growing activity and make it possible to extract and treat the silver and silver-lead ores at a profit. This may lead to a resumption of some of those former producers now idle.

In 1897 there were no mines producing copper exclusively on an important scale. The yield of nearly 4,000,000 pounds occurred in ores carrying their chief values in gold, silver, and lead. The copper output can therefore be said to be incidental to the other branches of mining.

For some years copper has been known to exist in the San Francisco Mountains of Beaver County. Attention of practical mining men has been turned to this section, and the opening of the districts may result in the development of a copper-producing section.

The production of over 75,000,000 pounds of lead in the State of Utah during 1897 indicates that this metal was an important factor in the mining industry. Especially is this true when it is remembered that it comes from all sections of the State and enters largely into the profits of all the leading mines.

Juab County lies in the central western portion of the State, and contains the Tintic, Fish Springs, and Deep Creek districts. The leading properties are at Tintic, and among these may be mentioned the Centennial-Eureka, the Bullion Beck and Champion, Swansea, Gemini, Farrell, and Eureka Hill mines. All are extensive producers of silver and lead. Of these, gold was a product from the Centennial-Eureka, Eureka Hill, Farrell, and Bullion Beck mines. The former two also produced some copper.

Tooele County lies north of Juab County. In the extreme eastern part is the Mercur district, where large deposits of gold have been opened to be worked by the cyanide process. The large yield of gold credited to this county originates at this point.

In Summit County, at Park City, about 25 miles east of Salt Lake City, is another region of silver-lead mining. Here are located the Daly, Ontario, Silver King, and Daly West mines. The principal values are silver and lead. All these carry some gold. The Silver King Mine was the leading producer in the State during 1897.

The principal producers in Salt Lake County were the Niagara, Old Telegraph, Phœnix, and Fortune and Keystone mines. These are all silver-lead producers, some gold being associated with these metals.

Copper is also a product of the Fortune and Keystone and Old Telegraph mines.

PRODUCTION OF GOLD AND SILVER IN UTAH DURING THE CALENDAR YEAR 1897.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Beaver	827.221	$17,100.18	296,824.44	$383,773.01	$400,873.19
Iron	1,555.556	32,156.20	3,111.11	4,022.44	36,178.64
Juab	37,038.938	765,662.80	2,877,600.19	3,720,533.58	4,486,196.38
Salt Lake	8,155.234	168,583.65	556,249.48	719,191.25	887,774.90
Summit	5,200.168	107,497.01	2,737,268.80	3,539,095.01	3,646,592.02
Tooele	34,857.912	720,576.99	90,525.29	117,042.80	837,619.79
Washington	.....	.....	27,777.00	35,913.70	35,913.70
Returns from custom smelters, mints, and assay offices, impossible to classify by counties	1,662.234	34,361.42	100,397.54	129,806.92	164,168.34
Total	89,297.263	1,845,938.25	6,689,753.85	8,649,378.71	10,495,316.96

BULLION OF UTAH PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1897.

Institution.	Gold.		Silver.		Total. value.
	Standard ounces.	Value.	Standard ounces.	Coinage value.	
ASSAY OFFICES.					
Helena	28.368	$527.78	.09	$0.10	$527.88
New York	1,777.460	33,069.02	3,696.77	4,301.70	37,370.72
Boise	217.012	4,037.43	22.28	25.93	4,063.36
MINTS.					
Denver	1,945.486	36,195.09	1,245.12	1,448.87	37,643.96
San Francisco	5,429.669	101,017.10	1,461.59	1,700.76	102,717.86
Total	9,397.995	174,846.42	6,425.85	7,477.36	182,323.78

DISPOSITION OF GOLD AND SILVER OF UTAH PRODUCTION DURING THE CALENDAR YEAR 1897.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Deposited at the United States mints and assay offices	8,458.195	$174,846.42	5,783.26	$7,477.36	$182,323.78
Shipped to custom smelters and refineries by producers	80,839.068	1,671,091.83	6,683,970.59	8,641,901.35	10,312,993.18
Total	89,297.263	1,845,938.25	6,689,753.85	8,649,378.71	10,495,316.96

PROPORTION OF GOLD AND SILVER CONTAINED IN UTAH ORES MINED IN 1897.

Source.	Gold.	Silver.
	Fine ounces.	*Fine ounces.*
From quartz and dry ores	6,114.668	60,927.73
From cyanide mills *a*	30,000.000	135,000.00
From lead ores	52,084.381	6,353,246.91
From copper ores	1,098.213	140,579.20
	89,297.262	6,689,753.84

a Estimated from data received.

No placer product can be ascertained for 1897. The only placer mining carried on in Utah has been at Bingham, and these "diggings" were idle during 1897.

XIII.

WASHINGTON.

By EUGENE B. BRADEN,
Assayer in charge, United States assay office, Helena, Mont.

The production of precious metals in the State of Washington during 1897 was 21,752.504 fine ounces of gold and 242,720.85 fine ounces of silver, valued at $449,664.15 and $313,898.46, respectively.

Below is a comparison of the 1897 yield with that of the previous year:

Metals.	1896.	1897.	Increase.
Gold	$395,489.51	$449,664.15	$54,174.64
Silver	301,778.54	313,898.46	12,119.92
Total	697,268.05	763,562.61	66,294.56

This indicates an increase amounting to $66,294.56 in the output of gold and silver during 1897. These figures have been compiled from returns furnished by the producers of precious metals in the State of Washington, and from data given by the various smelters and refineries handling the product of the mines, and from the records of the Government mints and assay offices receiving the bullion from this State.

Care has been taken to avoid all duplications in the preparation of the total product of the State.

Owing to the present nature of the industry it has not been found practicable to prepare more detailed tables than those that accompany this review. To do so and show the production of the different counties would be a breach of confidence in certain instances, as practically the entire output is from a single mine, and thus what has been given to this Bureau in confidence would really become public.

To review the yield and the origin of precious metals in the State of Washington it is necessary to go beyond the scope of actual production and look into the forces at work which will have an immediate influence on the future production. Nor can one be oblivious to the many discoveries and locations and the development of the same.

The increased production has an importance beyond that expressed in the above figures in that the development of the mineral resources of the State is being established on a productive and permanent basis. *Intense activity has characterized* the mining industry in the State of

Washington during the past year, and for the actual amounts of gold and silver produced this activity is proportionately much greater than in any other State. Only in recent years have the mineral resources of Washington attracted attention, and until recently the best energy and thought have been concentrated toward the prospecting of the enormous areas embraced in the several districts. As a result many valuable discoveries have been made, and their importance is rapidly attracting wide interest to the possibilities of these future mines. The increased production of $66,294.56 in a total yield of $763,562.61, or over 8½ per cent, thus becomes of paramount importance in that it shows a growth of this industry from prospecting and a desultory production to a profitable basis. To those who understand the progression of "prospecting" into "production" it is evident that Washington is, at no distant future, to take rank with the older producing States.

The inaccessibility of the mineral districts has retarded an earlier and a larger production. Thus far the discoveries have been of large bodies of low-grade ore, which will not warrant transportation to or treatment at smelters, but must be worked where mined, by milling, concentration, or cyaniding, in order to afford a profit. These districts constitute all of the northern and central western portions of the State. The mines of northern Washington are in Stevens and Okanogan counties, while those of the central western portion are in the Cascade mountains, which run north and south through this part of the State. In the former district is the Colville Indian Reservation, only recently opened to settlers. All of this reservation and all of Okanogan County are without railroad facilities, and the greater part of the region is without wagon roads. Thus the opening of the country must be intermediate to the discovery and the successful working of the mines. Now that the mineral wealth of this region has been demonstrated, strenuous efforts are being put forward to bring this section into convenient communication with railroad points for the ready securing of supplies and necessary machinery. Hereafter every improvement of these facilities will effect a proportionate increase in the production of gold and silver.

Greater obstacles to the development of the discoveries in the Cascade range are interposed than exist in northern Washington. The precipitous mountains and dense timber forbid so much as a trail to many promising claims, except by much hazard and expense. The demonstration of the worth and extent of the mineral resources in these mountains will bring about the opening of the present inaccessible sections and augment the output.

The yield of mill bullion came from Kittitas and Okanogan counties, and amounted to nearly $15,000. The output from the placer mines, amounting to $139,497.36, was recovered from the bars of the Columbia and Snake rivers in Asotin, Stevens, Okanogan, Lincoln, and Douglas counties, and from the auriferous gravels that were worked in Kittitas, Okanogan, Cowlitz, and Yakima counties

The production of smelting ores, from which a total of $609,125.38 was obtained, originated in the counties of Snohomish, Okanogan, and Stevens.

ASOTIN COUNTY.

Although tributary to the Blue Mountains, from which large values are secured in northeastern Washington, Asotin County does not produce either gold or silver from quartz. The yield in 1897 was about $6,000, and was secured by Chinamen and others working on the bars along the Snake River.

KING COUNTY.

This county lies west of the Cascade Mountains. The mineral discoveries have been in the extreme eastern part of the county, in the Miller River, Buena Vista, Snoqualmie, Money Creek, and Cedar River districts, at the head of the Skyhomish River. Attention was first turned to the Miller River district in 1892, and since then many locations have been made, and the opening of these districts still continues. Money Creek district is north of Miller River, and lies about Mount Phelps and Mount McCartney. The ore in both districts is generally a mineralized porphyritic quartz occurring in ledges. These carry values in gold and silver, with indications at times of copper and lead. The Buena Vista district lies along the north fork of the Snoqualmie River and is an extension of the Miller River and Money Creek districts. The general characteristics are the same. Locations have been made in the vicinity of Sallal and Snoqualmie Pass.

Since 1891 the district at the head of Cedar River has attracted considerable attention. Many quite promising locations have been made.

The original discoveries were in iron and copper pyrites carrying gold and silver. More recently, large ledges of free-milling quartz have been found. Although King County did not produce any large amount of precious metals in 1897, it is believed that as roads are built an output will be established that will increase as the industry is developed about the nucleus now presented in these districts named.

KITTITAS COUNTY.

This county, lying east of the Cascade Mountains, in Central Washington, has long been a producer of gold and silver from the placers and mines of the Wenatchee Mountains. These cover the northern part of the county. The principal mining operations are in the Swauk, Pehastin, Negro Creek, Wenatchee, Cle-Elum, Gold Creek, and Icicle districts.

Since gold was discovered in the Swauk Creek district, in 1868, placer mining has lost none of its importance. Only recently attention has been turned to the mineral-bearing rock of the district.

Liberty, situated near the center of the mining section, is the principal town and about 16 miles from Cle-Elum, a station on the Northern Pacific Railroad. Roads branch from Liberty to the several creeks

and to Blewett, 16 miles north. The claims along Swauk, Baker, Williams, and Boulder creeks are owned and worked by residents of the district. The aggregate yield is considerable. Outside capital has not been solicited to install modern appliances and the output is less than it may become should such methods be introduced. The gold from this section is distinctive. It occurs in large, flat nuggets worn smooth by erosion, and valued at about $16 per ounce. These nuggets frequently weigh several ounces, and are believed to average larger than any gold taken from the placers of this country.

Blewett is the principal town of the Pehastin and Negro Creek districts, a section lying almost midway between and accessible for both the Northern Pacific and Great Northern railroads. The auriferous gravels of the neighboring creeks were worked as long ago as 1860, when the first gold was discovered here. Since then they have yielded a large sum. Quartz mining is also followed successfully. The first stamp mill to be erected in Washington was built at Blewett.

The Blewett Gold Mining Company, a corporation composed of Seattle capitalists, bought a number of claims in 1892 on which a stamp mill had previously been erected. A modern 20-stamp mill has since been built and, besides working the ore from their own mines, has done custom work on ores mined in the district. The equipment includes concentrators, a tramway, and many other appliances to lessen the cost of treatment and increase the efficiency of the plant. The mines owned by the company are worked by leasers. During 1896 a small cyanide plant was built to work the tailings from the mill. The operations have demonstrated the superiority of the process to that of stamp milling for working the ores. Other quartz properties in the district have been equipped with small mills. By the milling done the value of the various discoveries has been practically demonstrated, and negotiations with Eastern capitalists are in progress looking to the bonding and sale of some of these claims. Should this be accomplished, it must result in the extensive development and equipment of the district, which would then take rank as an important producing section.

Some 3 miles from Wenatchee is a porphyry dike, containing large deposits of low-grade ore bearing gold and silver. This is in Squilchuck Canyon, and has interested mining men to explore its extent and possibilities. A 5-stamp mill was erected in 1894, but after running a few months it was found unprofitable to work the low-grade ore on a small scale and was abandoned.

The Cle-Elum district extends from the head waters of the Cle-Elum River eastward to Mount Stuart. A large number of locations of mineral-bearing ledges have been made which carry gold and copper. The actual production from the district in 1897 was small.

A short distance east of Snoqualmie Pass, near Kitchelos Lake, is the Gold Creek district. The country rock is granite and syenite, in which true fissure veins have been discovered. These carry gold and silver, but in the form of sulphides associated with other minerals. Active

exploration of these deposits is being done, machinery for the purpose having been taken into the district.

Discoveries of mineral-bearing deposits have also been made on Icicle Creek, a tributary of the Wenatchee River, from the vicinity of Mount Stuart. The ledges are large and the ore low grade. The locations have not been developed to any great extent.

OKANOGAN COUNTY.

Lying east of the Cascade Mountains, in the northern part of Washington, is a vast area in which many mineral districts are known to exist. In these, where mining has been carried on, the ore has proven valuable and affords encouragement to the general opening of the entire region. At present the distance from the railroads is great and transportation facilities are limited. The cost of all supplies and machinery is therefore largely increased and renders work and development very expensive. When these conditions improve, the region between the Cascade Mountains on the west and the Columbia River on the south and east, together with the western portion of the Colville Indian Reservation lying in Okanogan County, will become one of the principal mining sections of the State. Locations have been made of large deposits of low-grade ore, which have been demonstrated to be valuable when treated by the proper methods. The more important districts in Okanogan County are the Methow, Lake Chelan, Twisp, Stehekin River, Leavenworth, Salmon, Okanogan Lake, Palmer Mountain, and the Colville Indian Reservation. The claims which have been located in all of these are in vaious stages of development preliminary to the extraction of ore for future production.

The largest producing property in the county during 1897 was the Red Shirt Mine, in the Methow district, near Silver, on Beaver Creek. This property was located as long ago as 1887 and is owned by the Red Shirt Mining Company. The development of the ore bodies has been by tunnels aggregating several hundreds of feet. The vein averages 5 feet in width and carries both gold and silver. A modern and complete 20-stamp mill has been erected, capable of treating 60 tons of ore per day of twenty-four hours. The production from this property during 1897 was very creditable.

SNOHOMISH COUNTY.

This county, situated in northwestern Washington, was the leading producer of gold and silver during 1897. The well-known Monte Cristo mine, as well as the Forty-five, the O and B, the Independent, and other mines are situated here. The Monte Cristo, Goat Lake, Silverton, and Sultan districts have all been the scene of large activity and development. Other discoveries in the county are centered about Silver Creek and Mount Index.

At Monte Cristo the Rockefeller syndicate own a large number of *claims on which mining* operations have been extensive. The outlay

on these claims and associated interests represent the investment of an immense sum. They lie in a basin at the head of Sauk River and contain ledges of low and medium grade ore which has been developed to a considerable depth.

The Rockefeller syndicate, besides undertaking the purchase and development of the principal claims in the Monte Cristo camp, has built two costly tramways and a 300-ton concentrator. During 1892 and 1893 this syndicate also constructed the Everett and Monte Cristo Railroad from Everett to Snohomish and from Hartford Junction to Monte Cristo. The total distance was about sixty-four miles. A large portion of the line was built through a canyon that represented great engineering difficulties in construction and maintenance. Some twenty-six miles of this road were washed out by storms during the fall of 1897 and have not since been rebuilt. Should this not be done it will cripple the development of a region that was just assuming prime importance as a producer.

At Everett, the terminus of the Everett and Monte Cristo Railroad, the Puget Sound Mining and Reduction Company have built and operate a large smelting and reduction plant. The proximity of these works and the transportation facilities afforded by this railroad offered the great encouragement of low rates for freight and treatment to the owners of properties in the Monte Cristo, Silverton, and Sultan districts. Those properties situated above the wrecked portion of the railroad must, therefore, remain idle for the present.

STEVENS COUNTY.

This county constitutes the northeastern section of the State of Washington and contains a number of well-developed properties, from which only a small yield was taken during 1897. This county lies north of the city of Spokane, which is the mining center of this district as well as for that section of British Columbia lying immediately north of Stevens County. Communication is had with Spokane by the Spokane and Northern Railroad, which traverses the county from north to south.

Mining in Stevens County has been confined to the districts about Northport, Colville, and Cedar Canyon, and to those on the Colville Indian Reservation, known as the Pierre Lake, Koosmoos, Mascot, Eureka, Curlew, Negro Creek, and Empire districts. The principal attention during 1897 was given to those camps located on the Colville Indian Reservation.

At Northport a smelter of 200 tons' capacity has been built to treat the ores from the famous Le Roi gold mine, located at Rossland, British Columbia. Some custom work is also done by this plant. The Le Roi product is converted into copper matte and sent East for treatment. Near Northport the principal work in progress is on Red Top Mountain. The ores so far discovered are principally silver lead and carbonates. Some copper is also known to exist south of Northport. This district has the advantage of good wagon roads to the smelter at Northport.

The district about Colville has reached an advanced stage of development. While the actual production in 1897 was small, yet in former years there has been a large yield of silver. At that time the best developed and most productive property was the Old Dominion mine, owned by the Old Dominion Mining and Concentrating Company of Spokane. Some 7,000 feet of tunnels have been run for development since its discovery, and it is represented that the property is to be worked again. Some $2,000,000 have been produced in the past. The company also own a 70-ton concentrator to handle the ore that is too low grade for shipment. Other properties in the Colville district that have produced ore are the Young America, Bonanza, Summit, and Honest John mines.

The Cedar Canyon district is in the northern part of Stevens County. Here are located the Deer Trail No. 2, and the Cleveland mines that have been developed and make creditable showings of ore. They have also shipped considerable ore from which profitable returns were secured.

The principal camp on the Colville Indian Reservation is Eureka. The properties at this camp are steadily improving as development progesses, and it is likely that this must soon be placed as one of the greatest camps in the Northwest. The Republic mine is the best known property. It is owned by Spokane and Butte City capitalists, who have urged the work of exploration until it stands as a property without an equal, in promise, at the present stage of development. The ore is quartz, carrying free gold in a very finely divided state and perfectly adapted for cyaniding. A mill and other machinery are being installed on this property and the early working of the ore will materially increase the output of the State.

Small lots of placer gold have been secured in Garfield, Lewis, Lincoln, Pierce, and Whatcom counties, which would aggregate but a small amount. Owing to these having been handled by those who purchase small quantities, both their origin, identity, and amount have been lost.

BULLION OF WASHINGTON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1897.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
ASSAY OFFICES.					
Helena	4,634.212	$86,217.86	1,091.13	$1,269.67	$87,487.53
New York	14.943	278.01	5.03	5.85	283.86
Boise	48.018	893.36	7.14	8.31	901.67
MINTS.					
Philadelphia	79.654	1,481.93	23.07	26.84	1,508.77
San Francisco	3,405.784	63,363.42	766.49	891.92	64,255.34
Total	8,182.611	152,234.58	1,892.86	2,202.59	154,437.17

DISPOSITION OF GOLD AND SILVER OF WASHINGTON PRODUCTION DURING THE CALENDAR YEAR 1897.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	7,364.351	$152,234.58	1,703.58	$2,202.59	$154,437.17
Shipped to custom smelters and refineries, by producers	14,388.153	297,429.57	241,077.27	311,695.87	609,125.44
Total	21,752.504	449,664.15	242,780.85	313,898.46	763,562.61

PRODUCTION OF GOLD AND SILVER IN WASHINGTON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1897.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion	6,651.148	$137,491.42	1,551.49	$2,005.96	$139,497.38
Mill bullion	713.203	14,743.21	152.09	196.64	14,939.85
In dry ores and concentrates, classed as smelting ores	14,388.153	297,429.52	241,077.27	311,695.86	609,125.38
Total	21,752.504	449,664.15	242,780.85	313,898.46	763,562.61

TOTAL PRODUCTION OF PRECIOUS METALS IN WASHINGTON DURING THE CALENDAR YEAR 1897.

Description.	Quantity.	Value.
Gold ... fine ounces	21,752.504	$449,664.15
Silver (coining rate) ... do	242,780.85	313,898.46
Total production		763,562.61

XIV.

GOLD PRODUCTION OF THE STATE OF WYOMING.

By FRANKLIN R. CARPENTER,
Deadwood, S. Dak.

Placers: Mallory Gulch, Sand Creek, Spotted Tail	$750
J. G. Woodruff's (Landers, Wyo.) report	26,600
Total	27,350

PART II.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

AFRICA.

The total gold yield of the Witwatersrand district in 1897 was, according to the Ninth Annual Report of the Chamber of Mines of the South African Republic, 3,034,678 ounces, crude, against 2,280,892 ounces, crude, in 1896; an increase of 753,786 ounces, and of 2,826,557 as compared with the Rand's output ten years before.

The total gold production of all the Transvaal districts in 1897 was 3,289,720 ounces, crude, distributed among them as follows:

Districts.	Quantity.		Value.
	Oz.	*Dwts.*	
Witwatersrand	3,034,678	11	£10,583,616
De Kaap	113,972	0	398,902
Lydenburg	50,942	9	178,296
Klerksdorp	84,781	0	296,733
Zoutpansberg	225	15	791
Swazieland	4,979	2	17,427
Other districts	141	5	495
	3,289,720	2	11,476,260

SUMMARY.

Witwatersrand	3,034,678	11	£10,583,616
Other districts	255,041	11	892,644
	3,289,720	2	11,476,260

Corresponding, at a fineness of 0.847½ (the average fineness of Transvaal gold), to 2,788,038 ounces, or 86,719.62 kilograms, fine, of the value of $57,633,861.

Since the commencement of mining operations on the Witwatersrand the total production of gold in the district has amounted to 14,173,612 ounces 3 pennyweights.

The following table shows the output from year to year:

TOTAL GOLD PRODUCTION OF THE WITWATERSRAND.

Year.	Quantity.	
	Oz.	*Dwts.*
1887	23,125	8
1888	208,121	14
1889	369,557	5
Estimated unrecorded production, 1887, 1888, 1889	42,000	0
1890	494,817	0
1891	729,268	6
1892	1,210,868	16
1893	1,478,477	3
1894	2,024,163	12
1895	2,277,640	4
1896	2,280,892	4
1897	3,034,678	11
Total	14,173,610	3

The average number of stamps running per day was 3,567 against 2,949 for 1896, thus showing an increase of 618, and the efficiency was also improved, the service per stamp having been 4.53 tons in 1897 and 4.40 tons in 1896. Work was also more continuous this year, the mills having run for 329.69 days in 1897, as against only 308.65 days during the previous twelve months. The yield per ton shows a slight improvement; the return from the mill was 7.39 pennyweights against 7.48 pennyweights for 1896, a decline of 0.09 pennyweight, but from tailings it was 4.93 pennyweights against 4.72 pennyweights, and with the returns from concentrates and by-products the total yield per ton of ore crushed was 11.39 pennyweights, worth 39s. 9d., as against 11.12 pennyweights in 1896.

The quantity of ore milled exceeded that of 1896 by 1,313,658 tons, the figures being 5,325,355 tons for 1897 and 4,011,697 tons for 1896, giving an increased yield from this source as compared with the previous year of 468,473 ounces 13 pennyweights. Tailings show an augmented tonnage of 984,011 tons—3,791,973 tons in 1897, 2,807,962 tons in 1896—resulting in an increase in the yield of 271,546 ounces 13 pennyweights; the figures being 934,544 ounces 19 pennyweights in 1897, 662,998 ounces 6 pennyweights in 1896. In concentrates, of which tonnage is not given, there was an increase of 19,557 ounces 9 pennyweights—127,347 ounces 16 pennyweights in 1897, 107,890 ounces 7 pennyweights in 1896. The returns from other sources, principally obtained by private individuals from the treatment of tailings, of which direct information is not furnished to the chamber, have again fallen off considerably, the total for the year having been only 2,820 ounces 3 pennyweights—a decrease of 5,691 ounces 8 pennyweights.

The following is a summary of increases and decreases during 1897:

INCREASES.

Items.	Quantity.		Value.
	Ozs.	*Dwts.*	
Mill	468,473	13	£1,742,409
Tailings	271,546	13	928,272
Concentrates	19,457	9	69,223
	759,477	15	2,739,904
Less decrease other sources	5,691	8	20,629
Net increase	753,786	7	2,719,275

Total yield per ton of ore crushed, 11.39 pennyweights = 39s. 9d.; increase on 1896, 0.27 pennyweight.

OTHER INCREASES.

	Tons.
Tons milled	1,313,658
Tailings treated	984,011

Average number of stamps dropping per day, 618.
Increased efficiency of stamps per day, 0.13 ton.
Yield of tailings, 0.21 pennyweight per ton.

OTHER DECREASES.

	Dwt.
Mill yield per ton	0.09

The other districts of the Transvaal show an increase in total production of 37,987 ounces 11 pennyweights, made up as follows:

	Oz.	dwts.	Oz.	dwts.
Increases:				
Klerksdorp	45,963	0		
Lydenburg	555	9		
Swazieland[1]	4,979	2		
			51,497	11
Decreases:				
De Kaap	7,418	0		
Zoutpansberg	5,376	5		
Other districts	715	15		
			13,510	0
Net increase			37,987	11

The dividends paid by Witwatersrand gold mining companies during the past year (including the Consolidated Deep Levels and Rand Central Ore Reduction) amounted to £2,759,505, against £1,638,881 in 1896, the increase being £1,120,624.

WEST COAST OF AFRICA.

The figures given above show only the gold yield of the South African Republic. To obtain that of all Africa it is necessary to add to this amount the gold output of the West Coast, which is assumed to be equal to its export of gold bullion to England during the year; of Natal and Cape Colony, at present insignificant, and of Madagascar, which can only be approximated to.

[1] Separate returns for Swazieland were not received in 1896.

GOLD IMPORTED INTO ENGLAND FROM THE WEST COAST OF AFRICA DURING THE YEARS 1889-1897, INCLUSIVE.

Year.	Weight.		Value.	Weight.
	Standard (916⅔).	Fine.		
	Ounces.	*Ounces.*		*Kilograms.*
1889	44,554	40,841.17	$844,262	1,270
1890	37,242	34,138.50	705,705	1,062
1891	45,212	41,444.33	856,730	1,289
1892	53,402	48,951.83	1,011,924	1,523
1893	34,286	31,429.00	649,695	977
1894	30,326	27,798.83	574,653	865
1895	34,916	32,006.33	661,630	995
1896	33,138	30,376.50	627,938	945
1897	26,350	24,154.17	499,311	751

GOLD IN MADAGASCAR.

The Statistique de L'Industrie Minérale, published by the French ministry of public works, gives the gold product of Madagascar in 1892 at 261 kilograms, or 8,391 ounces, fine, of the value of $173,460.60. It adds that this is a "modified figure." The official statistics give for the value of the gold indicated a weight of 300 kilograms, corresponding to an average price of 2,997 francs per kilogram.

The total gold product of Africa in 1897 is obtained by adding the output of the Transvaal to that of the West Coast and of Madagascar, thus:

Year.	South Africa.		West Coast.		Madagascar. *a*		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
	Kilograms.		*Kilograms.*		*Kilograms.*		*Kilograms.*	
1889	11,719	$7,788,372	1,270	$844,262	261	$173,461	13,250	$8,806,095
1890	15,706	10,438,356	1,062	705,705	261	173,461	17,029	11,317,522
1891	22,398	14,885,639	1,289	856,730	261	173,461	23,948	15,915,830
1892	34,938	23,220,108	1,523	1,011,924	261	173,461	36,722	24,405,493
1893	42,573	28,293,831	977	649,695	261	173,461	43,811	29,116,987
1894	59,730	39,696,330	865	574,653	261	173,461	60,856	40,444,444
1895	66,045	43,893,300	995	661,630	261	173,461	67,301	44,728,391
1896	65,874	43,779,669	945	627,938	261	173,461	67,080	44,581,068
1897	86,720	57,633,861	751	499,311	261	173,461	87,732	58,306,633

a The gold product of Madagascar is assumed to have been the same in the years 1889-1891, inclusive, and from 1893-1897, inclusive, as in 1892. In previous reports of this series Madagascar's gold product was not included in that of Africa, but was stated separately.

PRODUCTION OF SILVER IN THE TRANSVAAL.

Respecting the production of silver in the Transvaal, the United States consul-general at Cape Town writes to this Bureau:

I beg to inform you that silver mining in the Republic is at a standstill and has been for several years. Some years ago there was one silver mine, called the Trans-

vaal mine, in operation; but, on good authority, it was a complete failure, and no statistics were ever kept or published. Gold is the principal mineral.

SUMMARY OF GOLD PRODUCTION OF DE KAAP GOLD FIELDS FOR THE YEAR 1897.

[As compiled by the Barberton Mining and Commercial Chamber.]

Months.	Weight.	Months.	Weight.
	Ounces.		*Ounces.*
January	7,325	September	8,062
February	10,328	October	8,161
March	7,380	November	10,857
April	7,628	December	9,965
May	8,867	Total	105,555
June	8,318	Add Sheba concentrates for 1897	8,417
July	9,449	Grand total	113,972
August	9,215		

STATEMENT OF GOLD OUTPUT FOR 1897, AS RETURNED TO THE KLERKSDORP CHAMBER OF MINES.

RECAPITULATION.

Source of product.	Mill.	Cyanide.	Dry process.	Other sources.	Total.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Eastleigh Mines	6,230	17,256	171	.....	23,657
Buffelsdoorn Est. & G. M. Co	22,980	25,559	.....	.....	48,539
Klerksdorp G. & D. Co	.....	.....	4,745	.....	4,745
Afrikander G. M. Co	.....	.....	1,575	.....	1,575
Other sources (from banks)	.....	.....	.....	6,265	6,265
Total	29,210	42,815	6,491	6,265	84,781

GOLD EXPORTED BY BANKS.

The following table shows the export of native gold from Witwatersrand by the following banks, viz: The Standard Bank, National Bank, Bank of Africa, African Banking Corporation, the Natal Bank, Banque Française de l'Afrique du Sud, and the Robinson South African Banking Corporation, during the several months of 1897:

Months.	Native gold exported.		Months.	Native gold exported.	
	Weight.	Value.		Weight.	Value.
	Ounces.			*Ounces.*	
January	204,541.71	£698,085	August	262,093.95	£905,257
February	209,639.82	721,436	September	265,779.26	914,713
March	238,399.04	813,771	October	256,309.57	880,610
April	235,218.90	803,305	November	292,931.21	1,021,786
May	266,054.13	924,293	December	294,724.74	1,024,001
June	249,023.89	852,185	Total	3,021,094.59	10,404,533
July	246,378.37	845,091			

STATEMENT SHOWING WEIGHT AND VALUE OF RAW GOLD EXPORTED FROM SOUTH AFRICA (CAPE COLONY AND NATAL) DURING THE SEVERAL MONTHS OF 1897, AS FURNISHED TO THE CHAMBER (OF MINES), BY THE RESPECTIVE COLLECTORS OF CUSTOMS.

[From the Ninth Annual Report of the Chamber of Mines of the South African Republic, pp. 407-410.]

Months.	Cape Colony.		Natal.		Total.	
	Ounces.		*Ounces.*		*Ounces.*	
January	202, 862	£698, 394	446	£1, 560	203, 308	£699, 954
February	213, 380	745, 118	448	1, 780	213, 828	746, 898
March	255, 998	892, 865	1, 038	3, 625	257. 036	896, 490
April	228, 213	795, 256	562	1, 828	228, 775	797, 084
May	254, 944	891, 731	340	1, 000	255, 284	892, 731
June	281, 506	985, 728	363	1, 270	281, 869	986, 998
July	235, 783	819, 544	473	1, 600	236, 256	821, 144
August	243, 841	849, 938	.....	.....	243, 841	849, 938
September	298, 715	1, 045, 222	206	900	298, 921	1, 046, 122
October	287, 616	997, 900	542	1, 900	288, 158	999, 800
November	278, 249	1, 012, 344	.....	.....	278, 249	1, 012, 344
December	358, 805	1, 257, 886	.....	.....	358, 805	1, 257, 886
Total	3, 139, 912	10, 991, 926	4, 418	15, 463	3, 144, 330	11, 007, 389

ARGENTINA.

The information received by this Bureau relative to the yield of gold and silver in Argentina in 1897 is as follows:

Their output can not be stated with accuracy. The most reliable sources give the amount of gold produced from the mines of the country at 207.184 kilograms, fine. This is a low estimate. The output is liable to be greatly increased this year (1898), by the opening of the San Juan and San Luis mines.

The weight of the silver produced from the mines of the country during 1897 is placed at 11,930 kilograms, fine. Prior to 1890 more than double that amount of silver was produced annually, but in consequence of the fall in the price of silver a gradual decrease in the production has taken place, and in this year (1898) the working of the Mendoza mines has been entirely suspended.

In the table of the world's production of gold and silver in 1897, the gold and silver output of Argentina is placed at the figures given above, with values, respectively, of $137,694.48 for gold, and $495,810.80 for silver (coining value).

AUSTRALASIA.

This bureau has been furnished with the following data regarding the production of gold and silver in the Australian colonies in 1897:

ESTIMATED PRODUCTION OF GOLD IN AUSTRALASIA FOR 1897.

[From returns furnished by the government of each colony.]

Colony.	Ounces.	Colony.	Ounces.
New South Wales	292, 217	Victoria	812, 765
New Zealand	251, 645	West Australia	674, 994
Queensland	805, 928	Total	2, 927, 959
South Australia *a*	29, 764		
Tasmania	60, 646		

a Quantity received at Sydney and Melbourne mints.

ESTIMATED PRODUCTION OF SILVER BULLION IN AUSTRALASIA FOR 1897.

[From returns furnished by the government of each colony.]

Colony.	Ounces.	Colony.	Ounces.
New South Wales	150,005	Victoria *a*	69,333
New Zealand	183,892	West Australia	.....
Queensland	234,065	Total	637,295
South Australia	.....		
Tasmania	.....		

a Extracted at Melbourne mint.

The estimated production of silver-lead and silver ore was 207,382 tons, valued at £1,888,123.

It has been the custom of this Bureau to estimate that Australian gold has a fineness of 0.920, which would make the gold yield of all the colonies of Australia, in 1897, 2,693,722 ounces, or 83,786 kilograms, fine, of the value of $55,684,182.

The commercial value of the silver-lead and silver ore produced (207,382 tons, valued at £1,888,123) was $9,188,550.57, which, at the average price of silver during the year ($0.60), represents 15,314,251 ounces, fine. This amount, plus the silver bullion produced (637,295 ounces), equals 15,951,546 ounces, or 496,252 kilograms, fine, of the coining value of $20,624,221, at which figures it appears in the table of the world's production in the present report.

While the Australian authorities give 207,882 tons, of the value of £1,883,123, or $9,188,550.57, as the amount and value, respectively, of the silver-lead and silver ore extracted in New South Wales and Tasmania in 1897, the subjoined paper by United States Consul John P. Bray, at Melbourne, reports that in 1896–97 the Broken Hill Proprietary Company in New South Wales alone treated 387,814 tons. The probable explanation is that in the latter period a quantity of ore was treated which had been extracted from the mines in a preceding period.

Be this as it may, the figures given for 1897 in Mr. Bray's valuable paper do not purport to be the total Australian production of silver in 1897. He gives them only as the bullion output of a single mine in New South Wales, leaving Tasmania largely out of consideration. Furthermore, to obtain Australia's total silver product in 1897 it is necessary to add to the amount of silver bullion obtained in the colonies themselves the quantities obtained in Europe from Australian silver-lead and silver ores. The returns of the latter for 1897 have not reached us, but in former years the amount extracted was very large.

Under the circumstances, the method of extracting the silver product of Australia followed by this Bureau for some years past is adhered to for 1897, although it leaves considerable to be desired, giving too large a product, since it makes no allowance for the value of the lead in the ores or for the cost of parting and refining. The estimates of *the silver product of Australia* for 1897 and previous years can be considered *only as provisional.*

AUSTRALIA.

CONSULATE-GENERAL OF THE UNITED STATES OF AMERICA,
Melbourne, July 1, 1893.

SIR: I have the honor to inclose herewith a report of the present condition of the silver-mining industry of Australia, which I have been instructed by the State Department to prepare and transmit to you.

I am, sir, your obedient servant, JOHN P. BRAY,
United States Consul-General.

The Honorable DIRECTOR OF THE MINT,
Treasury Department, Washington, D. C.

PRESENT CONDITION OF SILVER MINING IN AUSTRALIA AND THE FUTURE PROSPECT.

The silver districts in the Australasian colonies are few and are located at great distances from each other, the principal deposits being at Broken Hill, in the extreme western part of the colony of New South Wales, and the western coast of the island colony of Tasmania, in which latter is a new and almost undeveloped field, though at the present time it promises to be an exceedingly rich district. The discovery of silver ore in the Australian colonies is comparatively of recent date. In 1852, after the discovery of gold in the colony of Victoria, the attention of prospectors was devoted to this precious metal, and while silver and tin were found in small quantities in the colony of New South Wales, no special attention was devoted to the development of these deposits, as the gold fields yielded a much better return to the miner for his labor.

For many years it was known that an outcrop of silver had been discovered on what was known as the Barrier Ranges, located almost on the western boundary of New South Wales, near the South Australian border, but no attempt was made to prove the extent of the deposit.

It was not until the year 1883 that the rich discovery of silver ore on these ranges became known, and although the discoveries then made were small and unimportant, the reports in regard to the values were exaggerated and thousands of explorers were tempted to come to this district. Many of these returned to their homes, as they could find nothing in the prospect which would induce them to further prove the district, as the value of the deposit was not recognized. It was not until the latter part of September, 1883, that Charles Rasp, in conjunction with Messrs. Poole and James, pegged out what is now Block No. 12 of the Broken Hill Proprietary Mine. Mr. Rasp and Mr. McCulloch subsequently pegged out Blocks Nos. 13, 14, and 15, and later on Nos. 10 and 11 were taken up at the south end and No. 16 on the north end of the hills. These seven blocks have a length of nearly 2 miles, and have since been found to contain immense bodies of rich silver and lead ore.

Up to this time mining for silver had only been conducted on a small scale, and, consequently, knowledge of silver-bearing ores was not generally known and the mining investors in the colonies were slow to invest their money in a venture which they looked on as being too speculative in character, and it was only with the utmost difficulty that the original owners were able to hold the claim upon which they had expended so much time and labor. So discouraged did they become that after eight months' work two of the members of the original syndicate sold out. Toward the latter part of the year 1884 the existence of chloride of silver was found in the mine. This discovery gave additional impetus, and in a short time kaolin was discovered, which subsequently became a special feature of the mine. These discoveries insured the success of Broken Hill. A company was soon formed, and in August, 1885, the Broken Hill Proprietary Silver Mining Company was organized, with a capital of $1,557,280. In 1887 the company sold four of the seven

blocks which they held, retaining Blocks Nos. 11, 12, and 13, of 40 acres each, or 120 acres in all. At first the ore was sent to the neighboring smelters for reduction to bullion, to the amount of 180,209 ounces of silver. Soon, however, furnaces were erected on the mine, and early in the year 1886 the company commenced the treatment of their own ores. Additional furnaces were then erected, until in the year 1893 there were 15 at work, with a capacity popularly known as 80 tons each. Owing to the varied character and grade of the ore, it was found that with furnaces alone the best results could not be most economically obtained. To meet this want it was found necessary to erect machinery to especially deal with the several classes of the ore, and concentrating, leaching, and amalgamating works were then erected. These, together with the furnaces, it is said, constitute the largest reduction works owned by any one company in the world. Besides these, the company possess blast furnaces and large delivering works at Port Pirie, South Australia, a distance of 280 miles from the mine and connected by railway. In order to show the results of the working of this mine, a table is appended showing the number of tons of ore treated and the quantity of lead and silver produced as the result of such treatment for each half year from the organization of the company, in 1885, to November 30, 1897, and the total number of tons of lead and ounces of silver produced to the present time is also given, together with the average prices at which sales of both metals were effected, for each half year:

Date.	Quantity treated.	Production.		Average selling price.	
		Lead.	Silver.	Silver, per ounce.	Lead, per ton.
	Tons.	*Tons.*	*Ounces.*		
1885—November 30	48	.....	35,605	.....	.....
1886—May 31	1,103	.....	144,604	.....	.....
November 30	10,397	1,991	871,665	$0.99⅜	$67.23
1887—May 31	18,411	2,836	835,526	.97 1/16	66.88
November 30	28,800	6,512	1,267,699	.96¼	67.28
1888—May 31	39,789	6,774	1,633,737	.94	72.93
November 30	54,336	9,885	2,290,455	.93¼	69.67
1889—May 31	68,545	11,417	2,677,686	.92	65.57
November 30	88,639	13,659	3,325,613	.94¾	64.89
1890—May 31	103,399	15,400	3,855,331	.97⅝	66.99
November 30	103,912	14,939	3,872,546	1.07⅛	72.16
1891—May 31	138,645	24,222	4,918,124	.99⅝	67.04
November 30	147,473	17,466	5,028,914	.98	65.30
1892—May 31	180,852	26,843	5,754,940	.91⅜	60.34
November 30	73,973	9,654	2,310,208	.85½	53.73
1893—May 31	230,468	21,734	5,972,194	.83⅞	54.13
November 30	260,047	25,609	6,533,232	.74⅝	50.07
1894—May 31	269,245	25,639	7,287.337	.66 1/16	47.65
November 30	325,949	23,956	6,767,056	.63¼	46.72
1895—May 31	300,558	19,359	6,233,720	.62⅛	48.18
November 30	222,324	13,712	4,158,551	.65	50.62
1896—May 31	218,022	11,958	4,107,578	.66⅞	53.93
November 30	208,303	10,065	4,028,292	.66	52.99
1897—May 31	206,098	12,430	3,615,954	.63	56.26
November 30	181,716	10,917	3,248,586	.57¼	60.10
Total	3,481,047	336,977	90,775,153	.....	.....

It will be seen by the foregoing table that the lead produced from the ore from November 30, 1886, to November 30, 1897, will average nearly 11.59 per cent and about 30 ounces of silver to the ton. It will also be seen that the quantity of ore

raised from the mine varies materially from year to year. This may be accounted for by reason of fires which occurred in the mine and the strike of the workmen, during which period all work on the mine was suspended. The first dividend was declared in July, 1886, or just one year from the date of organizing the company; and, in all, 116 dividends have been paid, amounting to $31,476,988, in addition to which $428,252 has been paid in cash bonuses.

In addition to the lead and silver previously mentioned, 3,593 tons of copper and 27,158¼ ounces of gold have been taken from the Barrier Range. The other mines in Broken Hill, which were originally owned by the Broken Hill Proprietary Company, are Block Ten Company, Limited, Block F Company, Limited, and the British Broken Hill Proprietary Company, Limited, which comprises Blocks 15 and 16 of the old company.

These mines are all in active operation. The Block 10 mine alone raised during the half year ending March 31, 1898, 53,866 tons of ore, assaying 16.87 ounces of silver, 19.73 per cent of lead, and 25.53 per cent of zinc. This is a dividend-paying mine, having paid, in dividends and bonuses, from the 31st of March, 1891, to the 31st of March, 1898, inclusive, the sum of $3,455,215, and have at the present time a credit balance of $68,565.74.

It will be noted that the very marked fall in the price of silver has seriously affected the profits of the mine in this district; the almost periodical decline from 99⅝ cents per ounce in 1886 to 57¼ cents per ounce in 1897 has materially reduced the amount of dividends paid. In the upper level of the mines on the Barrier Range oxidized ore was found. This ore is amenable to direct smelting, but as the lower levels were reached this class of ore yearly became diminished in both quantity and quality, and it became necessary to consider the best method of treating the sulphides, of which immense and unmeasured quantities exist in the lodes of Broken Hill. These sulphides consist of and carry lead, silver, zinc, and sulphur to a more or less degree, and the separation of these ores is a subject which has been a study of the mining experts and chemists for years past.

At the present time the method adopted is as follows: The ore is first crushed in the usual manner and jigged in water, whereby the sulphide of zinc is separated from the sulphide of lead and the valueless materials pass away as tailings. The zinc produced, carrying some silver, is then either sold or put aside for future treatment. The sulphide of lead carrying the larger portion of the silver is then smelted in the usual manner and the bullion so obtained is refined and separated into various metals and sent to the market. The future prospect of mines located on the Barrier Range are favorable, and mining experts agree that for many years to come there will be a steady and profitable yield of silver, lead, and gold from this field and, with suitable machinery, it is thought that zinc could be treated to advantage.

We will now turn our attention to the comparatively new silver-mining fields located on the west coast of Tasmania. As late as the year 1882, this region was almost an unknown wilderness, and its value as a rich mining district was not even suspected. In the latter part of that year, however, Mr. Con Lynch came to Macquarie Harbor, in charge of a prospecting party from Hobart, and made the first discovery of gold in a creek, which has been called after the discoverer, Lynchs Creek.

This discovery, although it was not payable, is important from the fact that it stimulated further prospecting and attracted other gold seekers to the locality.

The west coast of Tasmania was at that time covered with an almost impenetrable scrub and thickly timbered forest and destitute of all animal and bird life. The Mount Lyell mine, which is at present, undoubtedly, the most valuable mine on the west coast, was discovered in October, 1883, by Messrs Karison, William, and Michael McDonough, who were at that time prospecting in the neighborhood of King River, but, meeting with very little success, they crossed a little creek and began prospecting; after a time they discovered an outcrop of quartz on one of the spurs of Mount Lyell. On reaching the top of this spur they came on a large outcrop of iron, which

is to-day the famous "Blow" of the Mount Lyell mine. Here, after many discouragements, they discovered and obtained a good prospect of fine gold. A prospecting area of 50 acres was then pegged out, and one of the party then walked to Waratah, a distance of 45 miles, to register the claim, and so began the first owners of the Mount Lyell mine. A little later Messrs. James Crotty and William Dickson became interested in the mine. Further prospecting operations then proved gold in payable quantities and sluicing operations were carried on with good results. Mr. Crotty then applied for and obtained a reward claim of 45 acres for his discovery of payable gold. During all this time the deposits of silver and other valuable metals in the mine was not even suspected, and it was not until after the formation of a company that the presence of silver and copper was discovered. A 10-head battery was then erected and a crushing was obtained, with the following results: A total of 1,874 tons of ore was crushed, which produced 1,672 ounces of gold and 852 ounces of silver, the bullion value of the gold and silver being $29,972.77.

The Mount Lyell being the most important mine in the western part of Tasmania, a short description of it may be of interest as an index of what is being done on this comparatively newly discovered mining district.

This mine is marked by an immense outcrop of ironstone and gossan, known as the "blow," which has proved to be the indicator for one of the largest mining deposits yet discovered. The mine is practically one of immense low-grade deposits of pyrites, containing copper as the chief constituent, but with the addition of gold and silver. A dark purple cliff of ironstone stands up 60 feet high on the eastern side of the gossan outcrop and here the foot wall of the lode underlies westerly into the hill. The gossan which caps the pyrites on the surface has been stripped away and a shaft sunk to the main body of the pyrites, which has proven to be a very valuable body of ores, being exceptionally high in copper values. The ore from this mine is treated by the pyritic process of smelting, which is the method recently perfected in the United States. It consists in making the sulphur and iron in the ore take the place of fuel to almost the total exclusion of coke. The product made in the furnace is a copper matte with from 40 to 50 per cent of copper and all the gold and silver contents of the ore. This matte is then taken to the converter's and fed into a small smelting furnace; the product thus obtained is pig copper, which contains 99½ per cent of pure copper. The pig copper is shipped to England, where it is treated by what is known as the electrolysis process and the gold and silver is separated from the copper. From the date of the formation of the Mount Lyell Company to the 11th May, 1898, 163,220 tons of ore has been treated, with the following results: Blister copper produced, 6,364 tons, from which has been obtained 6,291 tons of copper, 571,447 ounces of silver, and 29,015 ounces of gold. During the half year ending March 31, 1898, 62,868 tons of ore was treated, producing 201,520 ounces of silver and 11,106 ounces of gold. The Mount Lyell Company has now paid three quantity dividends of 97 cents per share, absorbing $682,380.63. In regard to the future of this mine it is almost impossible, at this early date in its history, to make a positive statement in regard to the permanency of the ore body. Dr. E. D. Peters, jr., M. E., who was especially brought from the United States to advise on the working of this mine, estimated that the tonnage down to the bottom of the rich ore winze, 50 feet below No. 4 level, in May, 1893, as 4,600,000 tons. Dr. Peters, furthermore, took only one-half of this quantity as payable, in order to allow for the lower-grade ore and other contingencies. The present calculable quantity to the 31st March, 1898, is 3,223,400 tons, which, however, may be increased by further exploration. Although this is not, strictly speaking, a silver mine, yet silver is one of the principal products, and the rich ore which has been raised has been a means of stimulating mining operations on the west coast of Tasmania. The only other mine of any importance in this district is the North Mount Lyell Mine Copper Company, which is located, as its name indicates, north of the parent company. As the ore from this mine carries such a large percentage of copper it does not properly come into this report, *though future developments* may prove a larger deposit of silver than has been

found up to the present time. The other mining districts in western Tasmania are known as Zeehan and Dundas fields, which contain silver and lead ore. Of these we will deal with the Zeehan field first.

The first discovery of silver-lead was made in this district in 1884 by a miner named Frank Long, since which time a number of valuable mines have opened. Among these may be mentioned the Western Silver Mine, which was self-supporting from the formation of the company to the present time. No less than 26,700 tons of first-quality ore has been raised from this mine since 1893, to the value of $1,567,013, and to the 1st of October, 1897, $583,980 had been paid in wages and $412,435.87 in dividends to the shareholders. The ore averages 53½ per cent of lead and 97 ounces of silver to the ton, the average value of the former metal being at the present time $65.69 per ton. Previous to 1893, 3,110 ounces had returned $201,789.42.

This mine embraces eight sections, a total of 340 acres, through which runs five distinct lodes. The main shaft has now been sunk to a depth of 516 feet, but it is the intention of the company to sink 300 feet farther in order to prove the country at a greater depth. This mine is well equipped with modern hoisting machinery, pumping and concentrating plant. The ore bodies of the mine are far from being exhausted, and the geological formation of this country is such that it is considered probable that there may be many more payable lodes undiscovered.

The Silver Queen Prospecting Association is another important mine in the Zeehan district, and has the distinction of being the first mine on this field to enter the dividend-paying list, and has always been a large producer of payable ore. It covers the extensive area of 400 acres, and it was at the junction of this mine and the Montana that the first argentiferous galena was discovered, which led to the establishment of the present town of Zeehan. There have been four shafts sunk on this mine, the deepest of which is 410 feet, and from the galena from the lode there is obtained 70 per cent of lead and 85 ounces of silver. The underlie of this lode is the greatest in or around Zeehan. In some places it is almost horizontal. Tributers are obtaining good return from the No. 3 lode of this mine, and during the half year from October, 1897, to April, 1898, the company received a royalty from these workers of over $4,379.85. The company own their own concentrating plant, capable of treating 100 tons of ore per day, in addition to which each shaft is provided with a powerful pumping plant. For a long period this mine turned out 400 tons of ore per month, valued at $58.40 per ton, but the output during the past six months was only 588 tons, which returned $2,554.91. At a greater depth it is expected that much better returns will be obtained.

The Montana Mine next commands our attention. This is an English company, having its offices in London. The mine was first opened in 1893, and has been dividend paying from the start. According to the published account, the profits have been as follows:

First year (1893)	$1,186.81
Second year (1894)	33,490.62
Third year (1895)	38,354.22
Fourth year (1896)	66,722.52

The accounts for 1897 have not yet been published, but it is reported that they show a handsome increase over the profit of the previous years.

This company recently imported extensive machinery for the purpose of sinking to the depth of 1,000 feet, in order to prove the lode at the lower levels. The output for the month of March of this year was 300 tons of silver-lead ore, containing 210 tons of lead and 27,000 ounces of silver, which is considered to be a good return on a mine the area of which in only 80 acres.

The Colonel North Silver Mining Company.—The mining property of this company is one of the richest in Zeehan, as it contains an area of 240 acres in what is known as the silver-lead belt of this district. The stock is principally owned in Melbourne, although there are a number of English shareholders. In the early days of the dis-

covery of silver ore in the Zeehan district the output of an immense formation was discovered on this mine which in places was no less than 500 feet wide. Great capital was required to work this large formation, and the result of the investment has been eminently satisfactory, not only to the shareholders of the company, but also to those who take an interest in the success of an undertaking presenting at the outset more than ordinary difficulties. The first work taken in hand after the prospecting shaft had proven the lode was to drive a tunnel, which has been extended 420 feet into the hill. The whole of the country passed through is more or less iron stained. Having thus proved the existence of extensive lodes at a moderate depth, a permanent shaft was sunk 200 feet, when, owing to the settled condition of the country, the management decided to open out, as it is termed. A tunnel 800 feet to the southeast of the main shaft had been cut and proved to contain some of the richest lead ore ever raised on the Zeehan field, assaying 83 per cent of lead. Other assays from the lodes give the following results: Silver, 41 ounces, 2 pennyweights; lead, 65.5 per cent; gold, 1 ounce, 2 pennyweights, 16 grains; copper, 2.7 per cent. No. 2 assay: Silver, 49 ounces, 19 pennyweights, 4 grains; lead, 68.86 per cent; gold, 10 pennyweights; copper, trace.

Mr. Montgomery, the government geologist of Tasmania, made a very favorable report on this mine shortly after its discovery and was sanguine that good ore would be found at a depth, and the recent discoveries have proved that his opinion was well founded. It is now expected that the ore will ride with the hill, and, if such be the case, over 160 feet of backs will be obtained by advancing into the hill. The company are now apparently within appreciable distance of proving the value of the property, for, if the lode in No. 2 tunnel maintains its present size, it will give a profit over working expenses and will prove to be a good property.

Next to the Colonel North Mine is the Empress, formerly called Grubbs, from which $243,325 worth of ore had been raised, all of which, together with $19,466, had been spent on the development of the mine. The Western Extended Mine adjoins the Western Mine to the north and west, and consists of 200 acres. Although this mine has not yet been thoroughly proved, from the No. 4 lode 5 tons of high-grade ore has been bagged, and upward of 500 tons of second-class ore are at the surface. The main shaft is now down 160 feet, where the ore body is now showing in the lode 9 feet wide. Levels now put in 27 feet, 87 feet, and 150 feet, respectively, cutting the ore body in each case. This sufficiently proves the mine to warrant the erection of a powerful concentrating plant. The ore now proved in the mine goes from 160 feet level to the surface, and shows a larger body of ore under foot. The Oonah Mine, which is also in this district, produces 2,400 tons per annum, and this will be considerably increased, now that their concentrating plant is in full working order. The most satisfactory feature of this mine is that the best ore comes from the greatest depth, which is over 250 feet.

In regard to the Zeehan field, I learn that it produces silver-lead ores to the value of $1,216,625 annually, from mines, too, with a few exceptions, which are imperfectly equipped with machinery or have none at all, and its ores are considered among the richest in the world.

If the Montana and Western mines prove valuable ore at the lower levels, at a depth of 800 feet to 1,000 feet the value of this field will be assured for many years to come.

Another important mining field on the west coast of Tasmania is what is known as the Mount Read district. The leading mines on this field are the Hercules and South Hercules. The latter is a promising vein of sulphides, and may yet become a valuable property. The Curtin & Davis Mine consists of 106 acres near the summit of what is known as the Godkin Range. The formation in the mine is about 8 feet wide, with bands of rich material running along it. The ore averages 122 ounces of silver and 11 per cent of copper, and the indications point to an increased bulk at a greater depth.

The Comet mine is located at Mount Dundas, about 10 miles north of the township of Zeehan. At the present time work on this mine has been suspended on account of the extensive fires which destroyed the whole of their machinery and buildings in February last.

New machinery is now being erected on the property, as indications point to large bodies of ore still being raised. The only other mine of any importance is the Oceana. The lease covers an area of 211 acres. Considerable ore has already been raised, but now that complete machinery has been provided, explorations will be carried on to a greater depth. Assays of the big lode have returned 41 to 62 per cent of lead and from 16 to 448 ounces of silver. In addition to this, a mass of milling ore has been exposed measuring 80 by 20 by 40 feet.

Although the country is of slate formation, yet the galena in some of the open cuts exists in a limestone matrix of excellent fluxing quality. To sum up the ore on the west coast of Tasmania, I have appended the following table:

Mines.	Quantity.	Value.
	Tons.	
Mount Lyell mine	7,000,000	$119,239,250.00
Mount Read	606,000	14,769,827.50
Roseberry	700,000	13,626,200.00
Curtin & Davis	28,800	1,306,655.25

Total value of ore on the west coast of Tasmania mined up to date, with the exception of Zeehan and Dundas district, amounts to $148,931,932.75. Add to this sum the output of silver-lead ores from Zeehan and Dundas, which amounts to about 140,000 tons, with a value, based on the present price of silver, of $7,494,410.

JOHN P. BRAY,
United States Consul-General.

UNITED STATES CONSULATE-GENERAL,
Melbourne, Australia, June 30, 1898.

PARTICULARS OF THE GOLD PRODUCTION OF QUEENSLAND IN 1897.

[From the annual report of the under secretary for mines to the honorable secretary for mines, Queensland, for the year 1897, by P. F. Sellheim, under secretary, department of mines.]

* * * * * * *

The output of gold during the year is the record one, leaving 1889, which so far has held that position, in the rear. The total value of the output has amounted to £2,553,141. The decreases have, with exception, perhaps, of Croydon, been comparatively trifling when ranged into line with the large increases exhibited by Charters Towers, Gympie, and Mount Morgan. The reefs furnished 624,007 ounces, the alluvial workings 37,124 ounces, and metallurgical works 6,992 ounces of gold. The bullion from cyanide works totaled 139,805 ounces. The yield from the latter source is likely to increase during the current year, and there is apparently sufficient material to work on for another decade. The majority of our larger mills are providing cyanide plants for the purpose of treating all the residues direct from the tables, so that eventually, when all the now available auriferous sand will be disposed of no decrease in the colony's general output need be apprehended.

The amount of gold passed through the customs for the last year was 813,206 ounces. In this item are included two items shipped from Cooktown and Thursday Island, totaling 7,886 ounces, probably the produce of New Guinea.

All the larger gold fields, with the solitary exception of the Etheridge, have now railway communication, and the gold purchased by the banks is at present invariably conveyed by their officers to the seaports. Hence only one gold escort is neces-

sary to be provided by Government—that is, from Georgetown to Normantown. It was considered possible in this case to lower the fee hitherto charged by one-half.

The general average yield per ton exhibits a drop from 1 ounce 3 pennyweights 10 grains to 19 pennyweights 19 grains per ton, occasioned, doubtlessly, by the fact that with improved mill treatment stone can be worked at present with profit that in the past would not have been considered worth reduction.

APPROXIMATE ESTIMATE OF THE PRODUCTION OF GOLD IN AUSTRALIA, NEW ZEALAND, AND TASMANIA DURING THE YEAR 1897.

[From returns kindly furnished by the deputy master of the royal mint, Melbourne.]

Colony.	Gold.	Colony.	Gold.
	Ounces.		*Ounces.*
New South Wales	292,217	Tasmania	60,646
New Zealand	251,645	Victoria	812,765
Queensland	805,928	West Australia	674,994
South Australia	29,764		

ESTIMATED YIELD OF GOLD FROM ALLUVIAL AND QUARTZ MINES SINCE THE YEAR 1877, AS SHOWN FROM WARDENS' REPORTS.

Year.	Alluvial.	Quartz.	Total.
	Ounces.	*Ounces.*	*Ounces.*
1877	164,778	188,488	353,266
1878	130,574	179,038	309,612
1879	107,402	181,154	288,556
1880	86,082	181,054	267,136
1881	70,821	200,134	270,955
1882	52,038	172,855	224,893
1883	35,327	177,460	212,787
1884	26,175	281,629	307,804
1885	21,936	289,005	310,941
1886	15,361	325,637	340,998
1887	21,700	404,223	425,923
1888	12,099	469,544	481,643
1889	10,287	728,816	739,103
1890	19,069	591,518	610,587
1891	16,021	560,418	576,439
1892	17,039	598,519	615,558
1893	19,292	597,648	616,940
1894	25,938	653,573	675,511
1895	28,792	602,890	631,682
1896	30,724	609,661	640,385
1897	37,124	770,804	807,928

NEW ZEALAND GOLD MINES.

[From The Mining World, London, January 29, 1898, p. 224.]

The New Zealand mines have, as a whole, failed to produce the increased results anticipated a year ago; have, in fact, shown diminished production of the precious metal as compared with the previous twelve months. It would be mere affectation to deny that the past year's record has been a disappointing one, especially to shareholders who purchased their interests at much higher prices than could now be realized; but, while disappointing, there is no reason to be disheartened, for it has to

be remembered that until a couple of years ago there were very few mines in New Zealand possessing the necessary pumping and other equipment for operations in depth, and that for the most part the work of development had not been very seriously taken in hand. The industry is really in a state of transition, from the more or less antediluvian to the up to date, and much as we should have liked to repeat in regard to New Zealand the story of highly satisfactory achievements, we can only urge upon those whose capital is at stake in the colony to exercise patience and not to be misled into sacrificing their shares at present prices.

Gold fields which have yielded gold to the value of over £53,000,000 in about forty years, mainly by the employment of primitive methods of extraction and reduction, have left no room for doubt as to their permanent character. The capital subscribed for New Zealand mining operations in the past two or three years has only been comparatively moderate, and much of that capital has not yet commenced to bear fruit. That it will do so, however, if the necessary energy and economic management are displayed, we entertain no doubt.

During the past year the Government returns of the amount and value of the gold produced have shown a total of 251,644 ounces worth £980,203, contrasting with 263,694 ounces worth £1,041,428 in 1896.

For the two years the quarterly returns have exhibited the following results:

Quarter ended—	1897.		1896.	
	Quantity.	Value.	Quantity.	Value.
	Ounces.		*Ounces.*	
March	69,621	£275,816	76,402	£301,502
June	60,046	233,928	44,208	173,502
September	60,220	232,743	76,051	302,974
December	61,757	237,716	67,033	263,450
Total	251,644	980,203	263,694	1,041,428

From this it will be seen that there was a decrease last year of 12,050 ounces, valued at £61,225. To a large extent, however, the falling off is more apparent than real, as it is more largely due to the fact that in many instances milling operations have been suspended pending the erection of modern plant than to any diminution in the grade of the quartz dealt with, while in some cases it has been deemed prudent to extend the developments and to obtain satisfactory reserves before starting or restarting crushing operations. In other instances delays have taken place owing to the erection of cyanide plants, in connection with which point it is gratifying to find that the New Zealand Government have passed the bill for the purchase of the cyanide process.

PARTICULARS OF THE GOLD MINING IN NEW ZEALAND IN 1896.

[From the New Zealand Mines Statement, by the Hon. A. J. Cadman, minister of mines.]

The total production of gold and silver was 358,001 ounces, representing a value of £1,052,017, compared with a value of £1,172,843 for the preceding year. This shows a decrease of £120,826.

The quantities and values of the gold and silver production for the year ending December 31, 1896, were as follows:

Metals.	Quantity.	Value.
	Ounces.	
Gold	263,694	£1,041,428
Silver	94,307	10,589
Total	358,001	1,052,017

GOLD MINING.

The decrease in the yield of gold during last year (1896) may be accounted for in several ways, and is not altogether due to the scarcity of the precious metal—as, for example, the increased demand for mining properties by English companies and the consequent change of ownership of many of the gold-producing mines, together with an alteration of policy in preparing for extensive exploring operations with the object of the more efficient workings of the mines in the future, led to a contraction in the quantity of ore mined. Many crushing plants were thus left comparatively idle, not for want of material to operate upon, but because it was deemed more advisable to let the ore remain in the ground until improvements in gold-saving appliances were effected than to continue mining and milling on the hand-to-mouth principle of the past. This applies both to the Hauraki district and to Reefton, which is the chief center of quartz mining on the West Coast gold fields. The alluvial fields of the West Coast and Otago also show a decrease in the yield, chiefly owing to the scarcity of water. A satisfactory yield of gold will, I have no doubt however, be maintained in the near future, when the new quartz-crushing mills now in course of erection are completed and kept fully employed.

Many of the claims taken up are now in the hands of persons who have given evidence of their desire to develop the areas by the expenditure of large amounts upon new works, but there are many claims and water rights held by persons who have failed to show what work they intend to do, and who are evidently not prepared to comply with the conditions under which they hold their properties. The certainty of tenure depends in a large measure on the holders of rights themselves, due protection being given to all who carry on work in a bona fide manner, while those who neither comply with the conditions nor take steps to obtain protection are liable to have their titles assailed at any moment. It is the policy of the government to aid in every way by giving security of title and other advantages to those who are developing the mining resources of the colony, but the holding of claims and other mining rights for merely speculative purposes will not be permitted.

The quantity of gold entered for exportation through the customs for the year ending March 31 last, as shown in table annexed, was 256,913 ounces, representing a value of £1,015,742, while the quantity exported for the same period of the preceding year was 302,690 ounces, valued at £1,196,081. This shows a decrease of 45,777 ounces. Of the quantity exported Auckland contributed 93,876 ounces, Marlborough 789 ounces, Nelson and West Coast 74,082 ounces, and Otago 88,166 ounces.

QUARTZ WORKINGS.

This important branch of the gold-mining industry continues to make rapid and advanced strides, notwithstanding the fact that the yield shows a slight decrease compared with 1895–96. This decrease has been in the most part from the mines in the North Island and at Reefton, the cause of which has already been pointed out. During last year 113,731 tons of quartz and tailings were treated in the Auckland district, yielding 198,547 ounces bullion, representing an estimated value of £354,256 as against bullion to the value of £378,107 for the former year, being a decrease of £23,851. In Nelson and the West Coast 15,369 tons of quartz was crushed for a return of 10,217 ounces of gold, valued approximately at £40,900.

In the future treatment of quartz for the extraction of gold the new plants erected on the different fields will be in a marked degree superior to those formerly in use. The adoption of labor-saving appliances—stonebreakers, elevators, and self-acting feeders—for the mills, the concentration of tailings and slimes, and improvements in the methods of dealing with the pyritous matter will be the means of reducing the cost of extracting the gold and silver from the ore.

The cyanide process, which is already used with success, is being made the subject of exhaustive experiments, with a view to improvements in the methods of percolation, filtration, etc. In the Hauraki district 77.7 per cent of the quantity of gold

and bullion produced was won by this process. The quality of the bullion extracted by the cyanide process was, however, of a lower grade than that obtained by amalgamation, the proportion of the value of the former being only 64 per cent. From the increase in the number of plants in which the Cassel Company's patent will be used, which are already erected and in course of construction, it is evident that this method of gold saving will be even more extensively used in the future. In view of present importance and the continuance of future great benefit arising from the use of the cyanide process, which is eminently suitable for the extraction of gold from a large proportion of the quartz found in New Zealand, it has been decided, subject to the approval of the legislature, to acquire by purchase the existing patent rights within the colony for the use of cyanide in the extraction of gold and silver.

Coromandel County.—The Hauraki mine continues to produce the richest quartz in this locality. The other mines, namely, the Scotty's, Kapanga, Success, Hauraki North, Tokatea, and Royal Oak have produced payable quartz, but the returns were limited, the operations carried on being chiefly toward development and not in working out the reefs. The Kapanga shaft, which is the deepest in the colony, has been sunk to a depth of 1,000 feet, and boring operations have been again resorted to with a view of further deepening the shaft. The Scotty's shaft is being continued, and has now reached a depth of 325 feet. Other shafts are also being put down in this portion of the district; while at Kauri Block, especially where three years ago the probability of mining activity appeared very remote, no less than fifteen engine shafts may now be seen, in all of which mines vigorous operations are being carried on, and hopes are entertained that the Hauraki reef will be traced through the ground adjacent to that now famous mine. The low levels at Tokatea are also being further worked, and a shaft is now sunk 100 feet below the adit level. At Kuaotunu the work of development in the Try Fluke and Kapai-Vermont mines is steadily progressing, and throughout the Kauri Company's land a good deal of prospecting work is carried on.

In this district 18,748 tons of quartz and 100 tons of tailings were treated during the year, yielding 35,846 ounces and 40 ounces of gold, respectively, representing a value of £100,911. The number of miners in this district was 1,329, of which 750 were employed in connection with the gold-producing mines.

Thames.—This portion of the district, where the rich ore deposits yielded such marvelous returns in the past, is now receiving the attention of English companies, and the low levels are about to be again opened up. The Queen of Beauty and the Deep Sinker shafts are being sunk in the southern end of the field, while in the Moanataiari and Kuranui-Caledonian mines shafts are being sunk and workings extended to develop the low levels at the northern end. To the eastward the Adelaide and New Alburnia shafts are being sunk to test the reefs at greater depths, and the Moanataiari low tunnel is also being extended. In the other parts of the district low-level tunnels are being driven to prospect ground lately taken up, as well as in the older claims where reefs were formerly worked with very profitable results.

During the past year 15,694 tons of quartz were crushed, yielding 10,829 ounces of gold, and 11,367 tons of tailings yielded 2,612 ounces of gold, representing an estimated value of £34,254. The number of miners in this district was 1,527, of which 572 were employed in the gold-producing mines.

Ohinemuri County.—The returns of the mines that have given continuous yields are again most satisfactory. A vast amount of work has been carried on in the Waihi district by the Waihi, Union, Waihi-Silverton, Waihi Consolidated, and other mining companies in the development of their reefs.

In the Waitekauri district, and also at Komata, Maratoto, Wharekeraupunga, Owharoa, and Karangahake, important reefs are being explored and additional milling machinery erected, which are evidence that the yields will be largely augmented in the near future.

During the past year 64,463 tons of quartz and 2,522 tons of tailings yielded by amalgamation 91 ounces and by cyanide 148,535 ounces of bullion, making a total of 148,626 ounces of bullion, representing a value of £218,068, which is equal to about £1 9s. 4d. per ounce; as against 147,500 ounces of bullion, valued at £174,355—equal to £1 3s. 7d. per ounce, for the previous year. During the year the number of miners in this district was 1,820, of which 1,018 were employed in the gold-producing mines, compared with 1,726 for last year.

Waihi Gold mining Company.—During the four weeks ending the 24th of July the Waihi Gold-mining Company crushed and treated 3,120 tons of ore, for bullion valued at £11,668, the average being £3 14s. 9½d. The present return shows enhanced value of the ore on that of last month, when 3,240 tons gave £11,823, the average being £3 12s. 11d. per ton. That in its turn was also an advance on the month before, when £11,297 in value was extracted from 3,294 tons, the average being £3 8s. 7d. per ton.

The grand total won from the mine, corrected to date from the figures absolutely realized in London, now reaches £571,040, the following table being the return from this famous mine since 1890:

Bullion won.	Weight.	Value.		
	Tons.	£	*s.*	*d.*
In 1890	.....	21,112	13	6
In 1891	.....	23,035	5	11
In 1892	18,236	44,888	2	4
In 1893	19,895	61,900	10	11
In 1894	24,864	82,827	2	2
In 1895	33,070	120,334	2	2
In 1896	34,400	137,321	8	2
Period ending Feb. 6, 1897	4,140	14,010	14	1
Four weeks ending—				
Mar. 6, 1897	3,120	10,585	7	4
Apr. 3, 1897	3,150	10,033	2	0
May 1, 1897	3,060	9,303	16	5
May 29, 1897	3,294	11,297	0	0
June 26, 1897	3,240	11,823	0	0
July 24, 1897	3,120	11,668	0	0
Aug. 21, 1897	3,120	11,757	1	10
Total	.....	582,797	6	10

Piako County.—This district is again receiving a considerable amount of attention. Prospecting works are being carried on at Waiorongomai, where the New Zealand Exploration Company is engaged in driving an expensive tunnel for the development of the reefs. This tunnel, when completed, will be upward of 2 miles in length. In the vicinity of Te Aroha Township the owners of the Montezuma and Mount Morgan claims are introducing the thermo-hyperphoric treatment of quartz, a new process, for which the highest results are claimed in dealing with complex and refractory ores. The Rev. J. Campbell has the conduct of operations, and the necessary plant is being erected under his supervision on a suitable site near the township. At the Tui district the Champion Company is again engaged in taking out quartz from their mine.

The quantity of quartz crushed and treated during the past year was 934 tons, yielding 3,763 ounces of low-priced bullion, representing a total value of £986.

During the year 100 men were employed on this field.

West Coast.—Reefton, which I have already observed is the chief quartz-mining center on the West Coast, has experienced a decided revival in consequence of a change of ownership in many of the mining properties and the application of capital

in developing the mines. The Consolidated Goldfields of New Zealand, Limited, in addition to having undertaken the construction of an expensive water race and erection of crushing machinery, are carrying on extensive prospecting works, and are sinking shafts and driving tunnels to work the deep levels. This example is being followed by others, while fresh discoveries are attracting attention, notably at the Victoria Range, in the Reefton district, and the Paparoa Range, to the northward of the Grey River.

Those reefs being at high altitudes, and above snow line, operations can not be carried on during the winter months. When the necessary machinery is erected for the treatment of ores, the West Coast quartz reefs will again furnish employment to large numbers of miners. In the Collingwood district the Taitapu Gold Estates Company have carried on extensive prospecting operations, and are about to erect quartz-crushing machinery in the vicinity of the reefs at Golden Ridge. Other companies have also commenced operations in this district, and the locality—one of the pioneer gold producers of the colony—is experiencing a revival of the mining industry. The quantity of quartz crushed during the year was 15,369 tons, for a yield of 10,217 ounces 10 pennyweight of gold, of the value of £40,870.

Otago.—The principal quartz mines are in the Macetown and Skippers districts. Mines are also worked at the Old Man Range, the Carrick Range, and Macraes Flat. At Skippers the Achilles Company is being profitably worked and extensive development works carried on.

The Cromwell mine at New Bendigo is also receiving attention, and increased returns are anticipated for next year. The rich returns from the Morning Star mine, at Long Beach, Preservation Inlet, have given evidence that the development of the resources of the West Coast sounds is only commencing, and that a prosperous future awaits mining enterprise in this remote portion of the colony. Attention is also being directed to other quartz fields in the ranges bounding the Clutha Valley, whilst in the Taieri River district the reefs at Barewood are being prospected with the aid of English capital. In the Nenthorne district also the attention of investors is being given to some promising reefs.

The quantity of quartz crushed during the year was 9,450 tons, for a yield of 10,247 ounces 18 pennyweights of gold, and a parcel of 19 tons of tailings treated for a yield valued at £69 14s., making a total value of £41,061 6s.

ALLUVIAL MINING.

This branch of the mining industry is confined to the Middle Island, in the Marlborough, Nelson, West Coast, and Otago districts.

Marlborough.—The principal fields in the Marlborough district are Wakamarina, Mahakipawa, and the Wairau, but at none of these centers is the industry in a very active state. At Mahakipawa the wash in the creek bed has been worked out, and attention is being directed to working the terraces and deep ground in the flat, a large extent of country where little or no prospecting has yet been done, and which, judging from the formation of the ground ought to contain auriferous gravels, might well receive attention.

Nelson.—The principal gold field in this district is at Collingwood. The Parapara Hydraulic Sluicing Company is still working, but no returns have been made known. A number of men are also engaged on the Takaka and Waingaro rivers. To the latter a track was constructed by means of a Government grant. On the Baton and Wangapeka rivers a revival has taken place, and it is expected that the operations on McRae's freehold will be conducted on an extensive scale. At the Mount Arthur table-land a number of claims have been taken up, and the asbestus deposits in this locality are also receiving attention.

West Coast.—The West Coast gold field, which extends a distance of over 270 miles, from Karamea to Jacksons Bay, has been one of the best gold producers in the colony, and will, as the water supply is improved for working the deeper ground, continue to yield satisfactory returns.

The Addisons Flat district affords employment to a large number of men, and it is hoped that the introduction of capital will shortly enable the low-grade cement in the vicinity of Charleston to be profitably worked. Dredging is also carried on in the Buller River at Fern Flat, and also at a place below Lyell.

Grey Valley.—This district has in times past afforded remunerative employment for large numbers of men, but the shallow levels having been practically worked out, it will be necessary for an abundant water supply to be provided for the successful working of the deeper auriferous drifts, which can only be done on an extensive scale and with modern and improved appliances.

Kumara.—The excellent water supply brought in by the Government in the Waimea-Kumara Race has enabled the miners in this district to profitably work the extensive layers of gravel which without the aid of this water supply could not have been done. The recent improvements in the storage of water will enable large areas of comparatively poor ground on the low levels to be sluiced away, and will continue to afford remunerative employment for a number of men.

Rimu and Kanieri.—The ground in the vicinity of the Kanieri Forks is being worked by means of the Kanieri water race, but at Back Creek and Seddons Terrace operations are retarded by the lack of an efficient water supply. Surveys have, however, been made with a view of ascertaining whether water can be delivered from the Kanieri Lake at a sufficient elevation to enable the large quantities of gravel in this locality to be worked by means of hydraulic sluicing.

Ross.—Efforts are still being made to secure capital to erect pumping machinery to drain the gravel drifts in the deep ground in this locality. The terraces are worked, where sufficient water is available, by means of hydraulic sluicing.

OTAGO.

The principal gold fields of Otago are at Tuapeka, Clutha Valley, Manuherikia Valley, Mount Ida, and the lake districts. Gold to the value of £20,954,891 has been obtained from the alluvial workings.

Tuapeka.—In this locality the Blue Spur Gold Mining Company still continues to profitably work the vast deposits of cemented gravel found on the schist bottom, while at Weatherstones and Waitahuna sluicing operations are still being carried on.

Clutha Valley.—The Clutha Valley contains the richest deposit of auriferous drift yet known in New Zealand. The bed of the Clutha River, which has been worked and yielded vast quantities of gold, is still giving excellent returns by means of dredging. The attention of capitalists is being directed to the ancient river beds, now covered to a great depth by a later gravel formation, which, by the introduction of ample water supplies, can be profitably worked by hydraulic sluicing and dredging.

Attention is also being directed to the Manuherikia district, and numbers of dredging claims are being taken up on the Manuherikia River and its tributaries. The absence of an efficient water supply has retarded the development of the immense resources of this district.

Lake district.—This district, which was one of the earliest worked in the Otago Province, and from which the yield of gold has been very large, has also experienced the revival of the interest in mining operations so general throughout the colony.

DREDGING.

This method of dealing with the auriferous deposits in river beds and in deep wet ground has been found to be peculiarly suitable to the requirements of the southern gold fields. On the Cardrona, Shotover, Kawarau, and Clutha rivers, and in Tuapeka and Waipori districts, dredges are in operation, and a number of claims have been taken up with a view of dredging being commenced. As each of these dredges costs from £3,000 to £6,000, and as it is anticipated that at least seventy dredges will shortly be at work, it will be seen that a very large amount of capital is invested in this branch of the mining industry.

The returns from this source in a marked degree add to the output of gold from Otago.

In addition to the phenomenally rich returns which are stated to be obtained by the electric dredge near Cromwell, six dredges have averaged 219 ounces each per month for July and August, or a total return of 2,698 ounces of gold, of the value of £10,500.

GEOLOGICAL EXPLORATIONS.

HAURAKI PENINSULA.

During the past season the systematic exploration of the Hauraki Peninsula has been commenced under the direction of Mr. McKay, Government geologist, and this work has been so far proceeded with that it is possible to indicate the different groups of rock formations in which gold and silver bearing lodes have been found and to determine approximately the areas of these and their relation to each other. This general information, when placed in the hands of the miner and prospector, will be of great assistance in the future development of this mining district.

It now appears that the vast development of volcanic rocks on the Hauraki Peninsula is of an exceedingly complex character, and consists of four or five distinct groups of igneous rocks in addition to the fundamental slates over which the volcanic series have been accumulated. It has been a matter of doubt whether gold-bearing lodes exist in the slates of the northern part of the district, and as respects some localities this matter has yet to be determined. At Kuaotunu the richly auriferous character of the slates has been demonstrated. In the lower levels of the Tokatea mine the slates have been pierced to a depth of more than 400 feet, and there is promise that the energetic prospecting works now in progress will prove successful. At the Tiki, Manaia, and Tapu Creek gold-bearing lodes are being followed in the slate country.

The older groups of volcanic rocks have their better-known developments at the Thames and in the Success-Tokatea Range, both important centers of gold production, from which an enhanced output of gold may be expected when the several works now in progress approach completion. The group next succeeding the Thames-Tokatea rocks has been called the Kapanga series. This contains rich mines in the vicinity of Coromandel, and is being extensively prospected over the area between Cabbage Bay and Kennedy Bay, and gives evidence of this proving a rich mining field. The Beesons Island group is the next younger of volcanic series. This, though often containing quartz reefs, is less productive of gold, but in this formation is found the rich silver lodes of the Great Barrier Island. Rhyolites, as the youngest group of the volcanic series, have a vast development along the east coast of the peninsula south of Mercury Bay. At a few places these are gold bearing, and on the banks of the Tairua River, near the Upper Landing, they contain opals of fine quality. These rocks form an important study, and possibly closely related with them are the Waitekauri rocks, than which as gold producers none on the whole peninsula are more important. The report by Mr. McKay for the present year concerns itself chiefly with the general geology of the peninsula, this being a necessary preliminary to the special examination of mines which it is intended shall commence during the coming season.

MINING MACHINERY.

As in former years, information has been obtained in regard to any new process for the treatment of auriferous and argentiferous ores, and also in regard to the new machinery and appliances in connection with mining. By giving the fullest publicity to this question, opportunity is afforded those persons who are engaged in mining pursuits of knowing the different patents that have been granted, and although the machinery or appliance may not come up to the patentee's expectation,

the ideas devolved may be the means of improvements being made by someone else who can detect defects in the patents. Plans and specifications of different machines and appliances in connection with mining will be found in the report of the inspecting engineer.

CONCLUSION.

In concluding my remarks on the mining industry, I would point out that the impetus given to mining operations through the introduction of capital has been shown in the increased number of mines in which prospecting and development work is being carried on, and in pursuance of which extensive mining and milling machinery has been erected. The number of special claims now taken up for quartz and alluvial mining in both new and previously worked ground and the attention devoted to prospecting gives hope for believing that additional exploration within auriferous areas will result in the discovery of quartz reefs and of alluvial gravel deposits containing gold in such quantities as will enable them to be profitably worked. The streams of capital for mining investment that first set in in the northern districts is being directed to the Middle Island, and, without being oversanguine, I think it can be reasonably expected that the interest taken in mining throughout New Zealand will continue to increase, that many new mines will be discovered, and that our mineral resources will be developed in such a manner as to insure steady yields from the mines, with highly profitable returns for shareholders.

The construction of roads and tracks for opening up new fields and also for improving the means of communication in the older districts is a matter of urgent necessity, and ample provision must again be made for the vigorous continuance of necessary works. In order to aid in the further development of the industry, substantial grants will also be required for prospecting, water conservation, and deep-level mining.

The continuance of mining prosperity will result in employment being found for miners and the country further opened up for the prospector, thus adding in a substantial manner to the advancement of other industries conducive in a marked degree to the progress and prosperity of the colony generally.

TABLE SHOWING THE QUANTITY AND VALUE OF GOLD ENTERED FOR EXPORTATION FROM NEW ZEALAND FOR THE YEARS ENDING MARCH 31, 1896 AND 1897, AND THE TOTAL QUANTITY AND VALUE FROM 1857 TO MARCH 31, 1897.

District and county or borough.	Year ending Mar. 31, 1896.		Year ending Mar. 31, 1897.		Increase or decrease for year ending Mar. 31, 1897.		Total quantity and value from Jan., 1857, to Mar. 31, 1897.	
	Quantity.	Value.	Quantity.	Value.	Increase	Decrease		
Auckland:	*Ounces.*		*Ounces.*		*Ounces.*	*Ounces.*	*Ounces.*	
County of Coromandel	40,253	£164,289	27,404	£113,116	.....	12,849	.....	.....
County of Thames	9,054	37,375	3,941	16,572	.....	5,113	.....	.....
County of Ohinemuri	60,287	218,401	57,115	205,981	.....	3,172	.....	.....
County of Piako	144	606	125	521	.....	19	.....	.....
County of Manukau	.....	.....	.....	.....	.....	.....	.....	.....
County of Marsden	1	4	.....	.....	.....	1	.....	.....
County of Whangarei	1	4	.....	.....	.....	1	.....	.....
Borough of Thames	7,289	30,150	5,291	22,041	.....	1,998	.....	.....
Te Aroha Town District	.....	.....	.....	.....	.....	.....	.....	.....
Total	117,029	450,829	93,876	358,231	.....	23,153	2,058,885	£7,768,664
Wellington	.....	.....	.....	.....	.....	.....	188	706

TABLE SHOWING THE QUANTITY AND VALUE OF GOLD ENTERED FOR EXPORTATION FROM NEW ZEALAND, ETC.—Continued.

District and county or borough.	Year ending Mar. 31, 1896.		Year ending Mar. 31, 1897.		Increase or decrease for year ending Mar. 31, 1897.		Total quantity and value from Jan., 1857, to Mar. 31, 1897.	
	Quantity.	Value.	Quantity.	Value.	Increase.	Decrease.		
Marlboro:	*Ounces.*		*Ounces.*		*Ounces.*	*Ounces.*	*Ounces.*	
County of Marlboro	3,173	£12,681	789	£3,070	.....	2,384	.....	.....
Blenheim Borough	.....	.....	.....	.....	.....	.....	.....	.....
Picton Borough	.....	.....	.....	.....	.....	.....	.....	.....
Total	3,173	12,681	789	3,070	.....	2,384	85,145	£$331,609
Nelson:								
County of Waimea	402	1,488	498	1,615	96	.....	.....	.....
County of Collingwood	3,411	12,519	2,036	7,729	.....	1,347	.....	.....
Total	3,813	14,007	2,534	9,544	.....	1,279	1,672,381	6,630,310
West Coast:								
County of Buller	12,911	51,634	10,899	43,518	.....	2,012	.....	.....
County of Inangahua	26,927	107,710	12,615	50,459	.....	14,312	.....	.....
County of Grey	22,030	88,118	20,772	83,170	.....	1,258	.....	.....
County of Westland	23,557	94,227	23,709	94,907	152	.....	.....	.....
Brunnerton Borough	.....	.....	.....	.....	.....	.....	.....	.....
Kumara Borough	246	986	311	1,244	65	.....	.....	.....
Hokitika Borough	889	3,550	384	1,532	.....	505	.....	.....
Ross Borough	3,161	12,645	2,858	11,431	.....	303	.....	.....
Reefton Borough	.....	.....	.....	.....	.....	.....	.....	.....
Total	89,721	358,870	71,548	286,261	.....	18,173	4,258,776	16,934,953
Canterbury	.....	.....	.....	.....	.....	.....	24	96
Otago:								
County of Taieri	734	3,006	1,708	6,904	974	.....	.....	.....
County of Tuapeka	26,207	106,081	25,011	101,834	.....	1,196	.....	.....
County of Vincent	22,958	92,980	23,430	95,507	.....	472	.....	.....
County of Maniototo	10,765	43,607	10,040	40,929	.....	725	.....	.....
County of Waihemo	1,874	7,384	687	2,802	.....	1,187	.....	.....
County of Waikouaiti	518	2,119	602	2,464	84	.....	.....	.....
County of Waitaki	1,836	7,522	1,814	7,436	.....	22	.....	.....
County of Bruce	1,161	4,680	1,042	4,180	.....	119	.....	.....
County of Lake	10,801	43,463	11,315	46,349	514	.....	.....	.....
County of Wallace	7,052	28,441	5,823	23,451	.....	1,229	.....	.....
County of Fiord	630	2,534	3,333	13,191	2,703	.....	.....	.....
County of Southland	4,325	17,508	3,282	13,273	1,043	.....	.....	.....
County of Stewart Island	68	271	50	200	18	.....	.....	.....
County of Clutha	25	98	29	116	.....	4	.....	.....
Borough of Alexandra	.....	.....	.....	.....	.....	.....	.....	.....
Dunedin	.....	.....	.....	.....	.....	.....	.....	.....
Total	88,954	359,694	88,166	358,636	.....	788	5,308,007	21,001,424
Unknown	.....	.....	.....	.....	.....	.....	122	484
General total	302,690	1,196,081	256,913	1,015,742	.....	45,777	13,383,528	52,668,246

TABLE SHOWING THE TOTAL QUANTITY AND VALUE OF GOLD ENTERED FOR DUTY FOR EXPORTATION FROM JANUARY 1, 1857, TO DECEMBER 31, 1896.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Ounces.			*Ounces.*	
1857	10,437	£40,422	1878	310,486	£1,240,079
1858	13,534	52,404	1879	287,464	1,148,108
1859	7,336	28,427	1880	305,248	1,227,252
1860	4,538	17,585	1881	270,561	1,080,790
1861	194,031	751,873	1882	251,204	1,002,720
1862	410,862	1,591,389	1883	248,374	993,352
1863	628,450	2,431,723	1884	229,946	921,797
1864	480,171	1,856,837	1885	237,371	948,615
1865	574,574	2,226,474	1886	227,079	903,569
1866	735,376	2,844,517	1887	203,869	811,100
1867	686,905	2,698,862	1888	201,219	801,066
1868	637,474	2,504,326	1889	203,211	808,549
1869	614,281	2,362,995	1890	193,193	773,438
1870	544,880	2,157,585	1891	251,996	1,007,488
1871	730,029	2,787,520	1892	238,079	954,744
1872	445,370	1,731,261	1893	226,811	913,138
1873	505,337	1,987,425	1894	221,615	887,839
1874	376,388	1,505,331	1895	293,491	1,162,164
1875	355,322	1,407,770	1896	263,694	1,041,428
1876	322,016	1,284,328	Total	13,313,907	52,392,430
1877	371,685	1,496,080			

RETURN RELATIVE TO GOLD-MINING OPERATIONS IN TASMANIA DURING THE YEAR 1896.

[From Statistics of the Colony of Tasmania for the Year 1896, pp. 310 and 312.]

Locality.	Alluvial mining.									Quartz mining.	
	Gold produced.	Value.			Average value per ounce.			Quartz crushed.	Gold produced.
	Ounces.	£	*s.*	*d.*	£	*s.*	*d.*	*Tons.*	*Ounces.*
Beaconsfield	33	123	15	0	3	15	0	35,067	39,039
Lefroy and Back Creek	100	400	0	0	4	0	0	2,271	2,668
Denison	60	234	10	0	3	18	0	.....	.....
Mount Victoria	.....	.....			.....			1,800	900
Lisle	1,600	6,200	0	0	3	17	6	.....	.....
Fingal, Mangana, and Mathinna	.....	.....			.....			15,000	12,500
West coast	3,691	14,348	15	3	3	17	9	.....	.....
Other districts	1,100	4,125	10	0	3	15	0	2,000	900
Total	6,584	25,432	10	3	3	17	1	56,138	56,007

Locality.	Quartz mining.										Total quantity of gold produced.	Total value of gold produced.		
	Value.			Average value per ounce.			Average yield per ton.							
	£	*s.*	*d.*	£	*s.*	*d.*	*Oz.*	*dwt.*	*gr.*		*Ounces.*	£	*s.*	*d.*
Beaconsfield	146,396	5	0	3	2	0	1	2	6		39,072	146,519	0	0
Lefroy and Back Creek	10,672	0	0	4	0	0	1	3	11		2,768	11,078	0	0
Denison	.....			.....			.....				60	234	0	0
Mount Victoria	3,262	10	0	3	12	6	0	10	0		900	3,262	10	0
Lisle	.....			.....			.....				1,600	6,200	0	0
Fingal, Mangana, and Mathinna	48,437	10	0	3	17	6	0	16	16		12,500	48,437	10	0
West coast	.....			.....			.....				3,691	14,348	15	3
Other districts	3,375	0	0	3	15	0	0	9	0		2,000	7,500	10	0
Total	212,143	5	0	3	15	9	0	19	23		62,591	237,574	5	3

DECENNIAL RETURN.

Years.	Alluvial mining.						Quartz mining.		
	Gold produced.	Value.	Average value per ounce.				Quartz crushed.	Gold produced.	
	Ounces.	*£.*	*£.*	*s.*	*d.*		*Tons.*	*Ozs.*	*dwts.*
1887	6,134	23,663	3	17	2		28,187	36,475	3
1888	5,455	21,015	3	17	1		27,231	34,155	19
1889	3,170	12,219	3	17	1		32,957	29,162	13
1890	5,895	21,185	3	15	8½		16,921	17,556	0
1891	6,759	26,031	3	17	3½		25,780	32,444	0
1892	10,896	42,163	3	17	3		43,334	34,214	0
1893	7,759	29,952	3	17	3		37,649	29,471	0
1894	7,663	29,605	3	17	3		41,419	50,396	0
1895	6,857	26,465	3	17	2		45,487	48,107	0
1896	6,584	25,433	3	17	1		56,138	56,007	0

Years.	Quartz mining.									Total quantity of gold produced.		Total value of gold produced.
	Value.	Average value per ounce.			Average yield per ton.							
	£.	*£.*	*s.*	*d.*	*Oz.*	*dwts.*	*grs.*			*Ozs.*	*dwts.*	*£.*
1887	134,870	3	13	11	1	5	21			42,609	3	158,533
1888	126,138	3	13	11	1	5	2			39,610	19	147,154
1889	107,484	3	13	8	0	17	16			32,332	13	119,703
1890	65,929	3	14	11½	0	16	12			23,451	0	87,114
1891	123,784	3	15	10¼	1	0	23			39,203	0	149,816
1892	131,907	3	8	1	0	14	19			45,110	0	174,070
1893	115,922	3	16	4	0	13	22			37,230	0	145,875
1894	195,880	3	16	0	1	1	10			58,059	0	225,485
1895	185,864	3	16	0	0	18	7¾			54,964	0	212,329
1896	212,143	3	15	9	0	19	23			62,591	0	237,574

RETURN SHOWING THE QUANTITY OF ORE SMELTED FOR PERIOD JUNE 25 TO DECEMBER 31, 1896.

Ore smelted	tons	26,028$\frac{13}{20}$
Yield:		
Matte	do	2,417$\frac{8}{20}$
Copper	do	1,235$\frac{1}{20}$
Silver	ounces	76,951
Gold	do	4,707

Fine dust not included.

AUSTRIA-HUNGARY.

According to official information received by this Bureau, Austria's output of gold in 1897 was 646,535 kilograms of gold ore, valued at 32,938 florins, or $13,346.48, representing 20.08197 kilograms, fine.

Besides this, 411½ kilograms of gold ore were produced by Austria's antimony mines as a by-product, but as no value is ascribed to the quantity thus obtained it is impossible to estimate how much fine gold was contained in it, and hence the gold product of Austria in 1897 must stand at 20.01897 kilograms, fine, which is slightly below the actual production of the country.

The amount of silver obtained in 1897 from Austria's mines was 20,627,770 kilograms of ore, valued at 1,871,801 florins, or $758,453.77

(commercial value), representing, at the average price of silver during the year, viz, $0.60 per ounce, fine, 1,264,090 ounces, fine, of the coining value of $1,634,379.

Hungary yielded in 1897, 3,350.27286 kilograms of gold, valued at 5,484,347.26 florins, or $2,222,257.51, representing 3,343.75 kilograms, fine. Its output of silver was 21,970.19 kilograms, of a "redemption" value of 1,206,643.13 florins; or 54.22 florins, or $22.25, per kilogram.

The subjoined table shows the total yield of the precious metals in Austria-Hungary in 1897:

GOLD.

Where produced.	Weight.	Value.
	Kilograms.	
Austria	20	$13,346
Hungary	3,344	2,222,257
Total	3,364	2,235,603

SILVER.

Where produced.	Weight.	Coining value.
	Kilograms.	
Austria	39,326	$1,634,379
Hungary	21,970	913,081
Total	61,296	2,547,460

At which figures it appears in the table of the world's production of gold and silver in this report.

BOLIVIA.

No information having been received by this Bureau relative to the production of gold and silver in Bolivia in 1897, it is assumed to have been the same as in 1896, viz, 1,128 kilograms of gold of the value of $750,000, and 466,650 kilograms of silver of the coining value of $19,393,900.

BORNEO.

The production of gold in Borneo, according to the Jaarcijfers uitgegeven door de Centrale Commission voor de Statistiek, Koloniën, for the years 1886 to 1896, inclusive, was as follows:

Year.	Weight.	Value.	Year.	Weight.	Value.
	Kilograms.			*Kilograms.*	
1886	149	$99,025.40	1892	98	$65,130.80
1887	178	118,298.80	1893	136	90,385.10
1888	136	90,385.60	1894	112	74,435.20
1889			1895	111	73,770.60
1890	62	41,205.20	1896	69	45,857.40
1891	94	62,472.40			

The production of gold in Borneo in 1897 is assumed to have been the same as in 1896, viz, 69 kilograms, fine, of the value of $45,857.40.

In the last report of this series the gold yield of Borneo in 1896 was placed at 111 kilograms; in the present one it is made to conform to the above table.

BRAZIL.

For 1897 no information has been received regarding the output of gold in Brazil from our minister at Rio de Janeiro, or from our representatives in any of the gold-producing States of the Republic, or from any unofficial but reliable source. Under these circumstances recourse must be had to an estimate; and no better method can be followed than that employed in calculating the gold product of Mexico, viz, to consider it equal to the exports of gold bullion from Brazil plus the amount deposited at the mint for coinage. There was no coinage of gold in Brazil in 1897, and the exports of gold bullion amounted to 63,547 ounces .916⅔ fine, or 58,251 ounces fine, of the value of $1,204,155.

The figures here given of the exports represent only the exports of gold bullion to Great Britain, but it is very probable that all the gold shipped from Brazil goes to that country.

This method of calculating the gold yield of Brazil seems the best that can be devised. It imports no gold bullion from England, although it does some gold coin from Europe, especially from Great Britain, and hence its export of gold bullion is most likely of its own production. Part of the gold it produces may, possibly, be retained at home for industrial consumption, but the amount can not be large.

If this method is a safe one to follow in estimating Brazil's gold product in 1897, it should be employed in calculating that of 1896 and 1895 also. For 1895 it gives a weight of 50,724 ounces .916⅔ fine, or 46,497 ounces fine, of the value of $961,178, and for 1896 a weight of 52,828 ounces .916⅔ fine, or 48,426 ounces fine, of the value of $1,001,054, at which figures the gold output of Brazil in 1895 and 1896 appears in the table of the world's production of gold and silver in this report.

BRITISH INDIA.

According to official information received from the Government of India, the weight of the gold produced from the mines of British India, in 1897, is shown in the following table:

Where produced.	Weight of standard gold.
	Kilograms.
Mysore	11,868.779
Madras	27.243
Total	11,896.022

These 11,896 kilograms, .916⅔ fine, represent 10,905 kilograms of pure metal of the value of $7,247,463, at which figure the gold yield of British India appears in the table of the world's production in the present report.

GOLD MINING IN THE COLAR FIELD OF MYSORE, INDIA.

By One who has Studied It.

[From The Mining World, London, January 22, 1898, pp. 180-182.]

Another brilliant year for Indian gold mining terminated in December last, but the value of the yield recorded in the annexed tables is not so great as forecasted it would have been (vide my article published in these columns at the commencement of last year). The younger mines in this field made a considerably better show than I had anticipated, and the Mysore mine did practically what I had expected it would, but from the Nundydroog Champion Reefs and Ooregum I had looked for better yields; however, in the case of the two former companies I feel convinced it is not from any deficiency in the management, as this in every way is highly satisfactory. I think it must be attributed to the whole force of stamps not being at continuous work as early as anticipated. In the case of the Ooregum, the lesser yield than anticipated must be attributed to the development not progressing as satisfactorily as hoped for.

It will be seen, by referring to Table II, that the yield of 1897 eclipsed that of 1896 by over £230,000 in value, and I now venture to make a forecast of about what the value of the yield for the present year will amount to. On the basis of each month in the present year giving a return only similar to that of December last, then the total yield for 1898 would reach considerably over £1,600,000. The Mysore mine will, it may be taken for granted, have, if not all, a portion of its new 40 heads crushing during considerable portion of the year; and, moreover, as the Champion Reefs Company has with its 140 heads enough milling power probably to crush about 2,700 tons more quartz per month than it did in December last; further, too, that the cyanide works on this property will be yielding greater returns shortly; also that 10 heads recently erected at the Tank Block are likely to be employed, and continuously; that about the middle of the year the Coromandel Company will be crushing with 30 instead of 20 heads; and, lastly, that the stamps of the Mysore Reefs, if not also those of the Balaghat, Mysore, and Nine Reefs are likely to be crushing much more constantly than last year.

I consider, also, when it is remembered that the younger properties are likely to be turning out quartz of a much higher value, that the total yield of this field for the present year should at least reach £2,000,000. This estimate should not be thought to be too high, as it is probable for a considerable portion of this year over a hundred more heads of stamps will be at work, and probably even upon richer quartz than last year.

Now let me refer to Table I. There we find that, with two unimportant exceptions (June and November), there has been during the past year a continuous total monthly increase in the returns; and it is expected that the Mysore Reefs Company will aid the returns this year by continuous monthly crushings, and that the Balaghat-Mysore and Nine Reefs will show considerably larger increases in yield for the same period also. It may, from a study of the foregoing, be taken for granted, excepting for accidents, that the larger producing mines on this field will materially increase their yield also.

Now, turning to Table II, it will be seen what a greatly increasing and prosperous business gold mining in this field is, each succeeding year invariably showing a large increase over that of its predecessor until last year it gave a total yield of nearly a million and a half sterling, with the likelihood of its giving £2,000,000 for the present year. *It will also be noted* here that the average of about 1¼ ounces of gold per

ton has been obtained from the grand total of 1,471,478 tons crushed in this field from their first opening.

This alone, I consider, speaks volumes for the richness of the field.

In conclusion, I do not think that any one could make a mistake in investing in any of the gold-producing mines in this field; but those who at their present prices invest in the shares of the Mysore West, Mysore Wynaad, Mysore Reefs, and Balaghat-Mysore companies will, I think, have good cause to congratulate themselves on having so done long before the end of the present year, as there is quite room for them all to more than double in market value in that time.

TABLE I.—SHOWING THE OUNCES OF GOLD PRODUCED AND VALUE, BY THE COMPANIES NOW AT WORK IN THE COLAR FIELDS OF MYSORE, INDIA, FOR THE YEAR ENDING DECEMBER 31, 1897.

Month.	Mysore.		Nundydroog.		Balaghat-Mysore.		Ooregum.	
	Quantity. *a*	Value.	Quantity. *a*	Value.	Quantity.	Value.	Quantity. *a*	Value.
	Ounces.		*Ounces.*		*Ounces.*		*Ounces.*	
January	9,510	£37,135	4,107	£15,317	176	£636	4,513	£16,879
February	9,523	37,159	4,242	15,944	.....	.....	4,671	17,316
March	9,631	37,909	4,284	15,964	.....	.....	4,690	17,562
April	10,014	39,398	4,294	16,078	.....	.....	4,759	17,888
May	10,242	39,884	4,639	17,443	.....	.....	4,808	18,102
June	10,254	40,242	4,633	17,473	.....	.....	4,632	17,354
July	10,309	40,286	4,772	17,962	.....	.....	4,667	17,450
August	11,008	42,830	4,784	17,780	.....	.....	4,617	17,350
September	11,037	42,920	4,845	18,205	.....	.....	4,612	17,235
October	12,404	48,119	5,057	18,978	.....	.....	4,629	17,046
November	11,516	45,037	5,380	20,193	.....	.....	4,636	17,311
December	12,069	*b* 46,768	5,340	*b* 20,693	.....	.....	4,595	*b* 17,806
Total	127,517	497,887	56,367	212,030	176	636	55,829	209,299

Month.	Champion Reefs.		Mysore West and Mysore Wynaad (Tank Block).		Mysore Reefs.		Nine Reefs.	
	Quantity. *a*	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ounces.		*Ounces.*		*Ounces.*		*Ounces.*	
January	9,848	£37,541	503	£1,937	237	£895	56	*b* £217
February	9,971	37,843	594	2,291	182	683	105	*b* 407
March	10,006	38,066	810	3,123	123	466	63	*b* 245
April	10,159	38,702	911	3,506	(?)	375	.....	.....
May	10,232	38,941	915	3,508	.....	.....	.....	.....
June	10,276	39,119	919	3,540	.....	.....	.....	.....
July	10,297	39,339	927	3,578	.....	.....	.....	.....
August	10,435	39,792	934	3,592	.....	.....	.....	.....
September	10,570	40,778	951	3,654	.....	.....	.....	.....
October	10,576	40,288	958	3,701	.....	.....	.....	.....
November	10,682	40,568	961	3,725	.....	.....	.....	.....
December	10,874	*b* 42,137	966	*b* 3,744	.....	.....	.....	.....
Total	123,926	473,144	10,349	39,899	542	2,419	224	869

a Returns from all sources. *b* Estimated at £3¾ per ounce.

TABLE I.—SHOWING THE OUNCES OF GOLD PRODUCED AND VALUE, BY THE COMPANIES NOW AT WORK IN THE COLAR FIELDS OF MYSORE, INDIA, ETC.—Cont'd.

Month.	Coromandel.		Gold fields of Mysore.		Total for month.
	Quantity.	Value.	Quantity.	Value.	
	Ounces.		*Ounces.*		
January	853	£3,245	109	£423	£114,225
February	*a* 1,025	3,865	107	415	115,923
March	1,075	4,061	75	291	117,687
April	1,105	4,122	82	318	120,287
May	1,142	4,287	121	469	122,634
June	1,158	4,361	136	528	122,617
July	1,170	4,397	144	558	123,570
August	1,178	4,455	129	500	126,299
September	1,105	3,549	151	586	127,227
October	1,014	3,834	226	576	133,142
November	1,071	4,095	208	*b* 806	131,735
December	1,004	*b* 3,891	310	*b* 1,202	*b* 136,241
Total	12,900	48,462	1,798	6,972	1,491,587

a Returns from all sources. *b* Estimated at £3¾ per ounce.

NOTE.—The Mysore West Company and Mysore Wynaad Company own and work conjointly the Tank Block. The returns by the gold fields of Mysore Company have been obtained through the cyanide process and amalgamation. The return of the Balaghat-Mysore Mine was obtained not from a fresh crushing, but by a treatment of tailings. The number of stamps erected by the various companies may or may not be crushing all, or at any time of the month. No tailings have been treated as yet from the Tank Block. Yerraconda Company has 10 stamps erected, but made no crushing in 1897. The Mysore Company is engaged putting up 40 more head of stamps at their mine, which, on completion, will give them 160 heads in all. The Coromandel Company has ordered their present stamping power to be increased to 30 heads of stamps, which will be completed about the middle of the year.

TABLE II.—SHOWING THE VALUE OF THE GOLD PRODUCED BY THE MINING COMPANIES AT WORK ON THE COLAR FIELDS, FROM 1884 TO DECEMBER 31, 1897.

Full list of gold-mining companies in the Colar field of Mysore, India.	Year of registration.	Value of gold produced in—							
		1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
Mysore	1880	£4,431	£23,987	£62,520	£50,826	£73,972	£193,152	£229,961	£260,069
Ooregum	1880	.....	.....	.....	.....	15,246	62,503	104,041	132,974
Nundydroog	1880	.....	.....	.....	5,737	26,487	22,947	58,006	89,345
Mysore Reefs	1880	.....	.....	.....	.....	.....	542	89,345	730
Nine Reefs	1881	.....	.....	.....	551	3,071	5,273	868	.....
Kempinkote	1893	.....	.....	.....	1,682	4,139	5,714	5,242	.....
Mysore West	1886	.....	.....	.....	.....	.....	.....	.....	.....
Mysore Wynaad	1886	.....	.....	.....	.....	.....	.....	.....	.....
Balaghat Mysore	1886	.....	.....	.....	682	10,538	13,782	13,821	20,282
Gold fields of Mysore	1886	.....	.....	.....	.....	.....	.....	.....	.....
Yerraconda	1894	.....	.....	.....	.....	380	233	.....	.....
Champion Reefs	1889	.....	.....	.....	.....	.....	.....	.....	.....
Coromandel	1892	.....	.....	.....	.....	.....	.....	.....	.....
Oriental	1895	.....	.....	.....	.....	.....	.....	.....	.....
Road Block	1896	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	4,431	23,987	62,520	59,478	133,833	304,146	413,651	503,400

TABLE II.—SHOWING THE VALUE OF THE GOLD PRODUCED BY THE MINING COMPANIES AT WORK ON THE COLAR FIELDS, FROM 1884 TO DECEMBER 31, 1897—Continued.

Full list of gold-mining companies in the Colar field of Mysore, India.	Year of registration.	Value of gold produced in—						Value of gold produced from June, 1884, to Dec. 31, 1897.
		1892.	1893.	1894.	1895.	1896.	1897.	
Mysore	1880	£249,393	£254,205	£202,302	£247,599	£440,817	£497,887	£2,791,121
Ooregum	1880	202,887	280,970	256,785	264,934	247,329	209,299	1,776,968
Nundydroog	1880	118,026	103,558	110 784	144,161	168,613	212,030	1,060,594
Mysore Reefs	1880	.....	.....	1,027	4,119	7,370	2,419	17,019
Nine Reefs	1881	.....	.....	.....	4,532	241	869	15,405
Kempinkote	1893	.....	.....	.....	.....	.....	.....	16,777
Mysore West	1886	.....	.....	1,039	15,400	24,038	39,899	80,376
Mysore Wynaad	1886	.....	.....					
Balaghat Mysore	1886	27,129	27,830	21,007	1,122	10 215	636	147,944
Gold fields of Mysore	1886	.....	.....	.....	.....	.....	6,972	6,972
Yerraconda	1894	.....	.....	.....	436	.....	.....	1,049
Champion Reefs	1889	25,711	119,662	204,441	272,472	328,996	473,114	1,424,396
Coromandel	1892	.....	.....	.....	844	24,119	48,462	73,425
Oriental	1895	.....	.....	.....	.....	.....	.....	.....
Road Block	1896	.....	.....	.....	.....	.....	.....	.....
Total	.....	623,146	786,225	798,285	955,619	1,251,738	1,491,587	7,412,046

NOTES.—The Kempinkote Company was originally the Indian Consolidated Company, and, when such, obtained the £16,771 from crushings.

The Yerraconda Company was originally the South-East Mysore Company.

The Mysore West Company and Mysore Wynaad Company have owned and worked conjointly the Tank Block since 1891

The produce of the Balaghat Mysore for 1896 and 1897 was not obtained from crushings, but from treatment of tailings only.

The produce of the gold fields of Mysore was obtained by the cyanide process and amalgamation.

CANADA.

The official information regarding the production of the precious metals in Canada in 1897 is contained in the following data furnished by the Hon. George M. Dawson, C. M. G. etc., deputy director of the geological survey of Canada. This statement is dated May 23, 1898, and represents the production completely revised. We give in addition an interesting communication from the United States consul-general at Ottawa, the Hon. Charles E. Turner, and from the annual report of the minister of mines a very full review of mining operations in the different districts of Canada. The statements are, however, dated somewhat earlier than the communication from Mr. Dawson, and consequently the latter's final estimates of production are used in our tables.

According to these figures there was an increase in the gold yield of the dominion in 1897 of $3,216,810—that is, its gold output considerbly more than doubled, the principal increase being in the Yukon.

GOLD AND SILVER PRODUCTION OF CANADA IN 1897.

Product.	Quantity.	Value.
Gold (ounces, fine)	291,583	$6,027,016
Silver (fine, in ore, etc.)	5,558,446	3,322,905
Total		9,512,905

The figures given in the preceding table bring out in a marked degree the gratifying results of the greatly increased activity in the mining industry during 1897.

All the gold-producing districts of the Dominion show gratifying increases, although by far the largest part is due to the discoveries of rich placer mines in the Yukon country and to the increased output of Trail Creek and other districts in British Columbia. The former increase amounted to about $2,250,000, and the latter to nearly $1,000,000.

Our consul-general at Ottawa is inclined to place the production of the Yukon at only $2,000,000, as will be seen from his letter which here follows:

CONSULATE-GENERAL OF THE UNITED STATES OF AMERICA,
Ottawa, March 29, 1898.

DEAR SIR: In response to your letter of March 21 asking me to obtain a report upon the gold production of the Dominion of Canada for the calendar year 1897, I have the honor to report:

The figures on the report of the department of mines of Nova Scotia, a copy of which you will find inclosed here, is, you notice, for the fiscal year 1897, ending September 30; but the figures in this dispatch are the very latest as received up to date. I will also send you in a few days a report of the department of mines at British Columbia, of which I have sent for copies.

In the Province of British Columbia, for the calendar year 1897, in placer mining, the gold production was 25,676 ounces, of the value of $513,520. In lode mining, 106,141 ounces, of the value of $2,122,820. Total, 131,817 ounces, of a value of $2,641,340. The Northwest Territory, including the Yukon, from the Saskatchewan district, about $55,000 worth, from $15 to $16 an ounce. The Yukon is reported to have yielded, according to the department of the interior reports, $2,500,000, of a value of about $15 per ounce. This amount is believed to be excessive, and the probabilities are that $2,000,000 is nearer the value than the amount reported. The Province of Ontario produced 11,412 ounces, of a value of about $19 net per ounce.

There was a great deal of prospecting operations started late in the year in the Province of Quebec, and within the last thirty days there have been several rich finds made, although the output last year was inconsiderable. The chances look favorable for material increases in 1898. The Province of Quebec produced last year only about $1,000 in gold, but of very good quality and valued at about $16 per ounce. Nova Scotia produced 28,000 ounces of extremely fine quality, valued at about $19 per ounce.

From these returns it will be seen a very substantial increase has been made in gold production the past year in all Provinces of the Dominion. The prospects are that the production in all the Provinces will be largely increased in 1898. Many valuable finds have been made and several milling plants installed which will produce bullion this year.

The total value of gold produced in the Dominion of Canada for the calendar year 1897 was about $7,000,000. The geological survey report states the amount as $6,100,000, but it is generally conceded that the amount is underestimated and that the figures are nearer $7,000,000.

In about thirty days the seventh report of the bureau of mines for the Province of Ontario will be out, which I shall take great pleasure in sending to you.

I remain, yours, very respectfully,

CHARLES E. TURNER,
Consul-General.

Mr. G. E. ROBERTS,
Director of the Mint, Washington, D. C.

The total silver production of the Dominion of Canada in 1897 was 5,558,446 ounces, of the coining value of $7,186,678 and the commercial value of $3,322,905. There was thus an increase in Canada's silver product in 1897 of 2,353,103 ounces over that of 1896.

PRODUCTION OF SILVER IN CANADA.

CONSULATE-GENERAL OF THE UNITED STATES OF AMERICA,
Ottawa, March 18, 1898.

DEAR SIR: As requested by the Department of State, I give you below a report of the condition of the silver-mining industry in Canada, also some figures showing the production for the year 1897.

The following table will show the amount of silver ore, in short tons, shipped to United States smelters in 1897, giving the amount from each mine:

Mine.	Tons.	Mine.	Tons.
Antoine	216	Payne	13,447
Black Diamond	1,352	Queen Bess	222
Best	76	Rambler	685
Charleston	78	Reco	1,119
Enterprise	622	R. E. Lee	83
Goodenough	144	Ruby Silver	53
Great Northern	304	Ruth	8,201
Hustler	129	Slocan Bay	230
Ibex	99	Slocan Star	5,295
Idaho	935	Surprise	273
Jackson	286	Wakefield	46
Lucky Jim	184	Washington	713
Last Chance	717	Wellington	131
Montezuma	41	Whitewater	4,021
Mountain Chief	60	Wonderful	60
Noble Five	1,387	Sundry prospects	458

The total production of silver in Canada for 1897 was 5,558,446 ounces, valued at $3,322,706.

The principal production was in the Slocan district of British Columbia, in which 32 mines produced 41,667 tons. The mines in British Columbia were very profitable, and very large dividends were paid.

The ores were very rich and found a ready market in the United States notwithstanding the low price of silver. The principal producers were the Black Diamond, Noble Five, Payne, Reco, Ruth, Slocan Star, and Whitewater. These mines were

operated very cheaply, requiring little or no mining machinery. Several well-equipped milling plants are in place at the more important mines for concentrating purposes.

Silver mining as an industry was begun in the county of Pontiac, Quebec, near Ottawa (on Calumet Island, in the Ottawa River), last year, and from the high values of the ore as given by the Balbach Smelting Company, of Newark, N. J., there is a likely prospect of this industry becoming important in this section.

In the Province of Ontario, in the Port Arthur district, on the north shore of Lake Superior, three or four mines which were worked at a profit a number of years ago, but which, on account of the low price of silver, were shut down, were reopened about the end of the year, and give promise of being important factors in the production of 1898.

The Kootenay district of British Columbia has been worked at a disadvantage for want of transportation facilities. The total output of silver in the Kootenay district up to the end of 1896 was valued at $4,028,224.

In the Slocan mining division the following description of the ore and ore deposits of this district is given by Mr. W. A. Carlisle in the report of the minister of mines for British Columbia for 1896.

THE SLOCAN MINING DIVISION.

There are four distinct kinds of veins in Slocan.

(1) The argentiferous galena, with zinc blende, and some gray copper in a gangue or matrix of quartz and spathic iron. These veins cut across the stratified rocks and through the dikes of eruptive rock, where, in many cases, there is a good body of ore, and they also occur in the granite area and, with even the limited amount of prospecting, some have been traced from 3,000 to 4,000 feet along the strike, and one for nearly 2 miles. In the Slocan slates it has not yet been proven, as the vein cuts through shales, slates, limestones, or quartzites, that any one of the series has been more favorable to the formation of ore bodies than another, as in the different veins it will be seen that good ore chutes may have the wall of any of these rocks mentioned. The ore has been deposited along fissures both in the open-fissure cavities and by impregnation of the country rock, and in the cavity-filled veins can be seen the banded structures described elsewhere, or the solid, usually big-cubed galena, shows lines of foliation parallel with the walls, but it is evident that further motion has occurred along some of these vein fissures after ore has been deposited.

Most of the veins are narrow, varying from 2 and 3 inches to 15 and 20 inches in width, with occasional widenings to 3 or 4 feet of solid ore, and even much more, as seen in the Slocan Star and the Alamo-Idaho veins. The ore chutes are not persistent horizontally, as is characteristic of nearly all veins, but ore is often continuous for several hundred feet, and where it then pinches a thin streak of oxides is the index usually followed in the search for more ore, which seldom fails to reappear with more or less work. The mistake is made sometimes of following along a slip wall or crevice that may cross the vein crevice at a flat angle, and thus lead the miner astray. Besides the solid ore, some veins have associated with them 2, 3, or more feet of mixed ore gangue and country rock, or a brecciated mass, which may be of such grade as to pay well for concentration; and already there are three concentrators—the Alamo, Slocan Star, and Washington—doing very satisfactory work, and the Noble Five mill almost completed, with the erection of two, at least, contemplated this year. The product or concentrates is silver-bearing galena, but any value contained in the decomposed material that may enter the mill will in all probability not be saved; likewise that in much of the gray copper, which apparently slimes badly and escapes.

The ore is shipped as "crude," or the solid or unaltered sulphides, or as "carbonates," i. e., the decomposed ore, consisting of oxides and carbonates of iron, lead,

and silver, the mass having a reddish-brown color, with more or less yellow material, those carbonates with a soft, velvety feel assaying highest in silver.

All material about these veins should be carefully assayed before being relegated to the waste dump, where good ore, unsuspected, has already been thrown, especially soft, iron-stained decomposed rock or vein matter.

While most of the veins are not wide, the richness of their ores greatly compensates, as may be seen from values as per smelter returns from a few of the mines, as:

Mines.	Silver per ton.
	Ounces.
Slocan Star	80 to 95
Reco	83 to 730
Goodenough	167 to 507
Noble Five	62 to 543
Last Chance	135 to 238
Wonderful	113 to 133
Ruth	40 to 125
Monitor	142 to 367
Wellington	125 to 328
Whitewater	72 to 326
Dardanelles	149 to 470
Enterprise	155 to 180
Two Friends	248 to 380

The other Slocan mines have ore of the same character and high grade. The lowest values in the above indicate the lowest smelter returns on ore that is classed as "carbonates."

The following table gives the silver production of Canada, by Provinces, as per the geological survey returns:

Year.	Ontario.		Quebec.		British Columbia.		Total.	
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
1887	190,495	$190,495	146,898	$146,898	11,937	$11,937	349,330	$349,330
1888	208,064	208,064	149,388	149,388	37,925	37,925	395,377	395,377
1889	181,609	162,309	148,517	133,666	53,192	47,873	383,318	343,848
1890	158,715	166,652	171,545	180,122	70,427	73,948	400,687	420,722
1891	225,633	221,120	185,584	181,872	3,306	3,241	414,523	406,233
1892	41,581	36,072	191,910	166,482	77,160	66,935	310,651	269,489
1893		8,689		126,439		195,000		330,128
1894			101,318	63,830	746,379	470,219	847,697	534,049
1895			81,753	53,343	1,693,930	1,105,289	1,775,683	1,158,633
1896					3,135,343	2,100,689	3,135,343	2,100,689
1897							5,558,446	3,322,905

I have the honor to be, sir, yours, very respectfully,

CHARLES E. TURNER,
Consul-General.

DIRECTOR OF THE MINT,
Treasury Department, Washington, D. C.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

[From the Annual Report of the Minister of Mines, 1897.]

METHOD OF COLLECTING RETURNS.

In the following table the method followed in assembling the output of the lode mines is to take the mill and smelter returns received during the year. The smelter returns for ore shipped in December are often not received until February or later, and as this report has to be in press by then, it has been thought most expedient to follow the above plan, or to take the returns for ore paid for, or realized upon, during the year.

According to the annual report of the minister of mines of British Columbia, the total production of gold and silver in the Province from 1858 to the end of 1897 was:

Gold, placer	$59,317,473
Gold, lode	4,300,689
Silver	7,301,060
Total	70,919,222

The following table shows the steady rate of increase during the past seven years and of the marked increase during the past year of 1897. As stated before, the influence of lode mining begins to be felt in the year 1892, since when the rate of increase has been entirely due to the production of the metalliferous mines, as the output of the collieries has not increased:

PRODUCTION FOR EACH YEAR FROM 1890 TO 1897, INCLUSIVE.

Year.	Amount.	Yearly increase.	Year.	Amount.	Yearly increase.
		Per cent.			*Per cent.*
1890	$2,608,803	.....	1894	$4,225,717	18
1891	3,521,102	35	1895	5,643,042	33
1892	2,978,530	.....	1896	7,507,956	34
1893	3,588,413	21	1897	10,455,268	40

The following table gives a statement in detail of the amount and value of the different mine products for the years 1896 and 1897.

However, although 1896 showed a very decided increase over 1895, 1897 shows a still greater advance in the production of gold, silver, lead, and copper.

AMOUNT AND VALUE OF MATERIALS PRODUCED, 1896 AND 1897.

Character.	1896.		1897.	
	Quantity.	Value.	Quantity.	Value.
Gold:				
Placer ... ounces	27,201	$544,026	25,676	$513,520
Lode ... do	62,259	1,244,180	106,141	2,122,820
Silver ... do	3,135,343	2,100,689	5,472,971	3,672,836
Copper ... pounds	3,818,556	190,926	5,325,180	266,258
Lead ... do	24,199,977	721,384	38,841,135	1,390,517
Total	.....	4,801,205	.....	7,565,951

PRODUCTION OF METALS, PER DISTRICT AND DIVISION.

Name.	Divisions.		Districts.	
	1896.	1897.	1896.	1897.
Cariboo			$384,050	$325,000
Barkerville division	$82,900	$65,000		
Lightning Creek division	53,000	25,000		
Quesnellemouth division	51,100	35,000		
Keithley Creek division	197,050	200,000		
Cassiar			a 21,000	37,000
Kootenay East			154,427	163,796
Kootenay West			4,002,735	6,765,703
Ainsworth division	345,626	440,545		
Nelson division	545,529	789,215		
Slocan division	1,854,011	3,280,686		
Trail Creek division	1,243,360	2,097,280		
Other parts	14,209	157,977		
Lillooet			33,665	39,840
Yale			206,078	226,762
Osoyoos	131,220	142,982		
Similkameen	9,000	25,100		
Yale	65,108	58,680		
Other districts			15,000	9,390
Total			4,816,955	7,567,551

a For Cassiar the production of $25,000 in 1896 from Omineca was lately reported.

PRODUCTION OF PLACER GOLD SINCE 1858, BY YEARS.

The following table continues the yearly production of placer gold to date, as determined by the returns sent in by the banks and express companies of gold transmitted by them to the mints, and from returns sent in by the gold commissioners and mining recorders. To these yearly amounts one-third was added up to the year 1878, and from then to 1895 one-fifth, which proportions were considered to represent, approximately, the amount of gold sold of which there was no record.

The gold output for 1897 shows no advance over 1896. The placer gold contains from 10 to 25 per cent silver, but the silver value has not been separated from the totals, as it would be insignificant.

YIELD OF PLACER GOLD PER YEAR TO DATE.

1858	$705,000	1874	$1,844,618
1859	1,615,070	1875	2,474,004
1860	2,228,543	1876	1,786,648
1861	2,666,118	1877	1,608,182
1862	2,656,903	1878	1,275,204
1863	3,913,563	1879	1,290,058
1864	3,735,850	1880	1,013,827
1865	3,491,205	1881	1,046,737
1866	2,662,106	1882	954,085
1867	2,480,868	1883	794,252
1868	3,372,972	1884	736,165
1869	1,774,978	1885	713,738
1870	1,336,956	1886	903,651
1871	1,799,440	1887	693,709
1872	1,610,972	1888	618,731
1873	1,305,749	1889	588,923

1890	$490,435	1895	$481,683
1891	429,811	1896	544,026
1892	399,526	1897	513,520
1893	356,131		
1894	405,516	Total	59,317,473

Since last report further information has been secured that has modified in some details this table as it then appeared, more especially in reference to the production of lead. This information of production in the earlier years is obtained from the "Mineral statistics and mines for 1896," Geological Survey of Canada.

PRODUCTION OF LODE MINES.

Year.	Gold.		Silver.		Lead.		Copper.		Total values.
	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.	
1887	.....	.....	17,690	$17,331	204,800	$9,216	.....	.....	$26,547
1888	.....	.....	79,780	75,000	674,500	29,813	.....	.....	104,813
1889	.....	.....	53,192	47,873	165.100	6,498	.....	.....	54,371
1890	.....	.....	70,427	73,948	Nil.	Nil.	.....	.....	73,948
1891	.....	.....	4,500	4,000	Nil.	Nil.	.....	.....	4,000
1892	.....	.....	77,160	66,935	808,420	33,064	.....	.....	99,999
1893	1.170	$23,404	227,000	195,000	2,135,023	78,996	.....	.....	297,400
1894	6,252	125,014	746,379	470,219	5,662,523	169,875	324,680	$16,234	781,342
1895	39,264	785,271	1,496,522	977,229	16,475,464	532,255	952,840	47,642	2,342,397
1896	62,259	1,244,180	3,135,343	2,100,689	24,199,977	721,384	3,818,556	190,926	4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	38,841,135	1,390,517	5,325,180	266,258	7,052,431
Total	215,086	4,300,689	11,380,964	7,301,060	89,166,942	2,971,618	10,421,256	521,060	15,094,427

GOLD.

Gold is obtained in British Columbia, either from the gold-bearing gravels of the placer mines or from the veins or lodes, and after these methods: (*a*) By smelting ore from the veins or lodes; (*b*) by milling and amalgamation, together with cyaniding of quartz ores; (*c*) by placer, hydraulic mining, or dredging of gravels.

Smelting ores.—Gold ores, not amenable to amalgamation or any of the wet processes, but profitably treatable, by smelting, to a copper-iron matte or base-lead bullion and refining, are now the source of most of the lode gold produced in the Province—as at Rossland. By many who are only familiar with free-milling ores the importance of these smelting ores is not appreciated, but their importance increases when it is learned that by this process a return of 95 to 98 per cent of the assay value is guaranteed; that smelting charges are decreasing; and that, with smelting plants becoming more easily accessible, the owner of a producing property of this class has not to incur the cost of a plant or mill to treat his ores, but can sell at once to the smelter.

Hence large bodies of sulphide and otherwise refractory gold ores, carrying from $15 to $20 per ton in gold (as are being developed in the Province) are becoming profitable, and in some centers will become more so when the railroads building or projected are completed. In Rossland, as stated elsewhere, the average *yield* value in 1897 for 68,804 tons was $30.48 per ton, with a *net* value or profit of $12 to $16 per ton, which net value will, in all probability, soon increase.

In the Boundary Creek region the now low-grade gold-bearing sulphide ores may prove on proper development to improve in grade, as is already promised in the work being done on some of the properties, and in other parts ore of this character may become available with easier access to the smelters. Again, ore of this class *too low grade to pay to smelt* may yet be found profitable by some wet process of *treatment, for which experiments* have not been exhausted.

Hence, with the extensions of the railroad systems now building, cheaper coal and coke, and better smelter rates, these smelting gold ores will become more profitable.

Free-milling ore.—Until recently only placer gold was sought out, and quartz veins received scanty and very desultory attention. Now this search for free-milling gold ores has become more general, but so far the amount discovered has not been large, partly because there has not been time to determine by mill tests the values in the quartz veins found, most of which so far appear to be low grade, hence requiring most careful testing, and partly because enough work has not been done to disclose pay chutes.

A large amount of quartz has been found in Fairview and Camp McKinney, in Yale, in Cariboo, in East Kootenay, in the Nelson division, in Lillooet, and along the coast and coast islands; but with few exceptions these veins, as tested, have proved to have low values. The "Cariboo" mine at Camp McKinney has a good ore chute that has paid $190,000 net. Very rich free-milling ore was taken out of the "Poorman" lead, near Nelson, and the "Fern" mine, near there, is now becoming a producer; but this class of mining has not yet made much headway, although the greater attention now being paid, the erection of stamp mills, etc., will greatly tend to prove up these leads, described elsewhere in this report.

Mention has been made of the rush northward to search for quartz leads. Samples of good gold-bearing rock have already been received from there, and much quartz is known to exist.

Placer gold.—The annual output of placer gold for many years has not been large, but companies are now opening up hydraulic mining leases in different parts of the Province, and some very large work is being done in Cariboo, as described. During the past year some engaged in dredging on the Fraser have met, for the first time, with encouraging success, and as the conditions are better understood, and more experienced men, with means and the plants best experience now recommends, attack this problem, the more hopeful it now becomes that the gold lying in these rivers will be at last secured.

SILVER-LEAD.

The silver mines of the Province produced by far the greater part of the output of the mines for 1897, and although the silver is not now held in such high favor, its friends are getting handsome returns from the high-grade ores, as produced in West Kootenay. With the notable exception of the silver-copper ore of the Hall mines and some of the smaller properties, all of the silver ore carries a very high percentage of lead; or occurs in galena, and, in two or three cases, galena and blende.

During the past summer the rapid decline in the value of silver, that proved so disastrous to other silver countries, had little effect on our silver mines other than to check investment, as the ores were usually of such high grade as to leave, even at the lowest price, a good margin of profit. The price of lead rose considerably, but this increase was offset by the increase of the export duty on lead into the United States, our best market, of 1.5 cents per pound on the gross lead contents in the ore.

So far, all this silver-lead ore has had to be exported to the United States for treatment, but at both the Trail and Nelson smelters lead stacks are being erected, and the smelting of this high-grade lead ore will be attempted, provided "dry ore," or that containing less than 5 per cent of lead, can be got to intermix. So far, the amount of this "dry" silver ore has been very small in this Province, and its discovery would greatly serve to simplify the smelting of these silver-lead ores within our own borders.

The following description of the mining region of the celebrated Cariboo district is also taken from the annual report of the minister of mines of British Columbia, for the year 1897:

Cariboo district.

In the following description of the mining region of Cariboo, it is not the purpose *of the writer to* attempt the relation of the early history of this now famous sec-

tion of the Province, but to describe the work now in progress and projected and some of the conditions that there prevail.

Since the year 1858 to the present time it is estimated that over $35,000,000 in gold has been taken from the Cariboo gravel deposits, of which 2½ miles of Williams Creek yielded up over $20,000,000. The production of Williams Creek, Lightning, Lowhee, Antler, Grouse, Keithley, Hardscrabble, Cunningham, Mosquito, Nelson, and other creeks of those early days, has become historic, but all these deposits at present known have long since been exhausted, leaving only such propositions as the deeper diggings that abundant capital well expended can alone grapple and make successful, or the old diggings and remnants to be worked and rewashed by the skillful and energetic Chinamen who always follow close after the white man to make money out of his prodigal leavings.

Other creeks and untouched gravels may yet be found in this region, although the prospector has been searching for many years; but only 20 miles from Barkerville, it is claimed, lies ground that has been but scantily worked. However, the intense interest now aroused by the great Yukon discoveries will lead many to explore a great extent of territory in this northern country yet untouched—to test many of the creeks by sinking to bed rock where only the bars have been tried.

Lack of water at suitable elevations has long deterred undertakings that otherwise would be very profitable, as in the creeks above Barkerville is a large amount of pay dirt that with water could be easily moved and made to yield handsome returns, while the old channel deposits in the Quesnelle district are just now being exploited.

Whether this needed water can be supplied or stored is doubtful in many instances, but such will be quite possible in others if the means are available to build waterways on a bold plan to bring water from long distances, as was done in California.

After the cessation of work on Lightning Creek, in the seventies, mining in Cariboo fell to a very low ebb until about 1893, when some new organizations with more or less capital began to explore these now practically abandoned placer and hydraulic claims and to prepare for mining on a scale not hitherto attempted, with the result that there has been a decided revival in interest, and besides these companies, other undertakings are now under advisement, and if during the coming two years several undertakings that have now reached that point where they should either spell success or failure prove to be successes, other companies will have little difficulty in raising funds to mine the deep gravels by drifting, or the higher channels by hydraulicking.

LOCATION.

The Cariboo division extends for 400 miles north of the Lillooet division and east from the Cassiar division to the provincial boundary line, but so far nearly all mining has been confined to a district of about 2,000 square miles, lying between the Fraser River, that first flows north and then south. Access is gained by the excellent Government road running north from Ashcroft, on the Canadian Pacific Railway, 210 miles to Quesnelle Forks, or 280 miles to Barkerville.

From May to November a biweekly stage, carrying passengers, mail, and express, runs each way, stopping over at hostelries along the road where good meals and accommodation can usually be secured, while a weekly stage runs during the other months. During the period of navigation the stage is left for the steamboat running between Soda Creek and Quesnellemouth, making an agreeable change of 50 miles on the long ride to Barkerville. At Quesnellemouth the trails start for Omenica and Cassiar and other points in the great wilderness to the north, while the stage road turning sharply in the east runs about 40 miles to Barkerville. During the coming season this highway promises to become of a greater importance, as a large number of men with their supplies may enter this northern country via this route, bound, not so far as Dawson City, but for the great stretches of untried country that are about to be more carefully explored.

During this last autumn engineers for the Dominion Government examined the *upper reaches of the Fraser* and other waterways north of Quesnellemouth to con-

sider the amount of work necessary to remove several, but not very great, barriers to river-steamboat navigation, by the removal of which barriers flat-bottomed steamers from Soda Creek will be able to penetrate much farther north.

TRANSPORTATION.

All merchandise, mining machinery, supplies, etc., are carried from the railroad at Ashcroft north by the freight teams with from four to ten horses each, the former well-known bull teams having now only one team left on the road. With good roads in good weather a team will go through to Barkerville in three weeks, but with heavy roads it will take much longer. Feed for the horses has to be carried, as such is often scarce and always very expensive, oats selling for 2 to 6 cents a pound and hay from $50 to $125 per ton, according as the season has been favorable or not to the ranchers, who, with such prices for their produce, promptly paid when mining is in progress, are not very keen for railroad facilities. Since the revival in mining a few years ago all land that can be cultivated or irrigated has been taken up along the road, and the past comparatively wet season saw bountiful crops, although the year before was a poor one and many cattle died last winter from lack of fodder and the long, cold season.

Costs of transportation (as well as traveling) are high—so high that the freight charges on mining machinery and supplies are often more than the first cost—but the lowest freight charges can be got during the period of good sleighing in winter, when there is a reduction of $20 to $35 per ton. In summer the freight charges to Barkerville are 5 to 6 cents per pound, to Quesnelle Forks 4 to 5 cents, and to intermediate points in proportion.

Shipping points.—Ashcroft is the headquarters of the British Columbia Express Company, which controls the transportation of passengers, mails, and express to the northern country. For freighting, several concerns also make this point their chief base of supplies, and supplies can be forwarded by agents here or contracts can be made with the freighters themselves. During the past few seasons the greatly increased amount of freight has brought a very much larger number of teams onto the road, and, besides the regular forwarding companies, there are many independent teams, corresponding to the tramp steamers in marine shipping.

CHIEF DISTRIBUTING CENTERS.

Along the Cariboo stage road are many stopping places designated according to the nearest milepost, and from 108-Mile House the road branches off to the mines on Horsefly River. At 150-Mile House is a distributing point of long standing, as from here freight passes on to Barkerville, or that for Quesnelle Forks and the mining companies on the forks of the Quesnelle is sent over a new road to Quesnelle Forks, a town that was established in the very earliest days on the point of land between the North and South forks. For many years after the wave of whites had passed on to the other diggings a large colony of Chinamen was settled here, almost the only white man being Mr. William Stephenson, the Government agent, but since the advent of these large mining companies this place has again become of some importance, and now trails lead hence to Barkerville, Quesnellemouth, and Horsefly.

Soda Creek, on the Fraser, is the point where the road leads into the Chilcotin country, and a steamer can be taken to Quesnellemouth when there is no ice.

At Quesnellemouth, where the Quesnelle River enters the Fraser, is an important distributing point, where large supplies of goods can be secured and taken by pack animals over the trails, or by small boats, at present, part of the way into the Omineca and Cassiar and Peace River country, or goods sent into this point by wagon and steamboat are thus sent on. The main road also runs to Barkerville and Stanley.

Barkerville was the center of very great activity in the sixties, in the heyday of the rich placer diggings, and now is the point from which some of the companies

operate, and the quartz-bearing mountains can be reached. It is also the terminus of the Cariboo road. Stanley, on Lightning Creek, is on the main stage road, but is very quiet since the cessation of mining on this creek.

GEOLOGY.

In the report of the Geological Survey of Canada, 1887-88, are contained the results of the geological investigations of Amos Bowman, M. E., from which the following brief sketch is taken:

"*Physical features.*—A closer examination of the features of this region (the Cariboo) establishes the fact that northwesterly trends so remarkable for continuity and regularity in the region of the Upper Columbia are here carried out in all the geological and physical details. The Cariboo Range, forming the northeastern limit of the Cariboo country, is the northwesterly continuation of the Selkirk Range. The crystalline schists or gold belt seen on Quesnelle Lake is represented by similar rocks on Shuswap Lake and in Eagle Pass.

"The region of Mount Agnes (near Barkerville) and Snowshoe Plateau is an expanse of smooth and rounded flat-topped schistose hills having the same uniform northwesterly trend, and rising in Cariboo district to an altitude of a little over 6,000 feet. To the right and left of it, following the same trend, are low-lying valleys forming the present drainage channels of the country. These are occupied by recent deposits. Lying alongside of them are ranges of hill occasionally rising into mountains, which represent valleys of an older date—*i. e.*, syncinals or troughs occupied by rocks newer than the gold-bearing series. The valley of the Quesnelle River, on the left or southwest side, is 4,000 feet lower than Snowshoe Plateau, while the valley of Bear River and Bear Lake, on the right or northeast side, is 3,000 feet lower than the gold range.

"Two remarkable breaks cross the schists or gold belt connecting the two valleys described. The valleys are occupied by streams characteristic of the present drainage system, and by lakes. Cariboo Lake and Quesnelle Lake extend, or formerly extended, entirely through and across the axis of this belt. These lakes and the low-lying valleys connecting them are accompanied by narrow belts of level land. Much of it is in the form of terraces or benches.

"Three-fourths of the territory of the Cariboo district is above the 3,000-feet contour. Snow lies on the ground above that altitude for four months in the year. Quesnelle Lake is closed by ice from November to March.

"*Geology.*—Approaching the Cariboo country from Ashcroft, on the Canadian Pacific Railway, the traveler passes over a region, extending from Cache Creek to Clinton, of chert rocks and limestones which have yielded fossils of Carboniferous age, and which occupy the plateau in parallel undulations between the Rocky Mountains and the Coast ranges. Passing the plateau of the 'green timber' (extending over a large extent of country), these undulations are seen to have been completely buried in places by a series of Tertiary clays, sands, and gravels, capped by volcanic matter and covered by drift of glacial origin and date. Underneath the Tertiary represented by the gravels and volcanic matter of the green timber are clays and lignites.

"Exclusive of the superficial deposits, the rocks met with in the Cariboo district may, according to our present knowledge of them, be classed as follows in descending order:

"Cainozoic—Preglacial gravels, Pliocene (?), basalts, clay shales, etc., with lignites, Miocene.

"Mesozoic—Quesnelle River beds, argillites, agglomerates, etc., in part at least Lower Cretaceous.

"Paleozoic—Bear River beds, limestones, cherty quartzites, and beds of volcanic material, probably in part Carboniferous.

"Paleozoic (Lower)—Cariboo schists, rocks more or less completely crystalline, of very varied character.

"Archæan—Quesnelle Lake crystalline series, granites, and granitoid rocks."

The geology of those parts of Cariboo visited during the past season by the writer may be briefly outlined from the same source, and the parts of greatest interest are: (*a*) Quesnelle River and Lake region; (*b*) Barkerville region.

(*a*) In the Quesnelle region much of this territory, especially to the south and west of the lake, is part of the great interior plateau, while on approaching the rivers the hills become mountainous, which to the east in 10 or 12 miles form part of the main range. In this region we are most concerned in the auriferous gravel deposits lying in the ancient river beds and the terraces of gold-bearing gravels found high up on the hill or mountain sides, which are not only being mined to-day by such companies as the Cariboo Hydraulic, Horsefly Mining Company, Miocene Gravel Mining Company, etc., to be described, but have enriched the present river and streams forming the modern placer ground that has been, and still is in a desultory manner, mined by whites and Chinamen. Hence interest attaches to the formations of the recent, Post-Tertiary, and Mesozoic periods.

"*Recent.*—The low-lying valleys of Beaver Creek, Quesnelle River, and Bear River and the higher valley of Willow River are observed to have flats which are frequently 1 to 2 miles in width. Still higher lying meadows than those of Willow River are found in places on nearly all the tributary branches at various altitudes. Usually these occur where the configuration of the country has led to the formation of the basins in the interrupted descent of the streams.

"The material of the recent deposits consists of the ordinary thin stratum of humus, or loam, overlying very extensive bodies of sand and gravel. The latter were washed down from higher deposits of gravel and sediments of older date and were bedded in the flats by the present stream.

"*Post-Tertiary and Tertiary.*—The formations of the Post-Tertiary and Tertiary are unimportant as to the area covered and are superficial in character, but in point of fact the entire surface of the country is covered by Post-Tertiary detritus, blending into still older gravels, partly Tertiary, of as great or greater economical importance.

"The volcanic rocks of Tertiary age which are so widely distributed over the plateau were noticed at only two points, viz, on the north arm of Quesnelle Lake and at Guys Mountain.

"*Mesozoic.*—Quesnelle River beds: A large area which can be definitely referred to the Lower Cretaceous, accompanied by an old series of rocks (which may be Jurassic), occupies the trough of the Quesnelle River Valley.

"This belt is crossed in traveling from Beaver Lake to Quesnelle Forks and thence to Kangaroo Creek. It has an average width of 16 miles within the area of the map. All along the Quesnelle River and at Cedar Creek, on the lower Quesnelle Lake, this formation has yielded auriferous gravels. These were the first 'pay gravels' discovered and the first to be profitably mined in the Cariboo country.

"The prevailing habitus of the series is that of mixed volcanic and sedimentary rocks. Massive beds succeed each other with great regularity. The limits of the formation are: Along Beaver River Valley on their southwest side and along a line from Upper Swift River to Spanish Lake Valley on the northeast side. The latter boundary extends in a northwesterly direction to Lightning Creek, below the Bonanza mine, where it forms Red Canyon of Lightning Creek, between the Bonanza and Boyds Cold Spring basin. In the opposite or southwesterly direction it continues to Quesnelle Lake, striking the lake a few miles above Lynx Peninsula; thence eastward, it forms the south shore of Quesnelle Lake.

"*Aspect.*—The hills composed of these rocks are much lower than those of the underlying gold-bearing (Cariboo) schists on the northeast. Their surface is rough and craggy. Generally they are from 2,000 to 3,000 feet lower than those of the gold-bearing schists.

"*Rocks.*—The bulk of the strata constituting the group is chiefly the result of sedimentary deposition, while others are clearly of contemporaneous volcanic origin,

both molten and fragmental. Among these were found the characteristic conglomerates of the Shasta group. The cementing material is often a brownish or greenish mass. From conglomerate to breccia, with the same cementing material, they pass into a compact rock consisting of the cementing material alone. Sometimes this is crystalline and in massive beds, less frequently bedded. Of the mineral ingredients, aside from hornblende and feldspar, the crystalline varieties are frequently fine in grain and not readily determined without the microscope."

(*b*) *Barkerville region.*—Under this heading may be described, in short, the very important area of the Cariboo schists, in which the famous gold creeks of this district have carved out their basins and which carry the many but as yet unproductive quartz veins. Dr. Dawson, Mr. Bowman, and other geologists and mining men believe these gold schists to have been the source of the gold in the great placer deposits, and the day may yet come when paying mines will be discovered among the many quartz veins in these schists, which hitherto have failed to disclose chutes of pay ore. (See report below on quartz veins.)

Mr. Bowman has stated that these "gold schists" of the "Cariboo schists," occupying a belt 16 miles, with a probable depth of 5,000 feet, consist of very highly altered sediment clays and sandstones, with occasional bands of limestone and calcareous shales, comprising the well-known and characteristic "slate rock" that varies from black to bluish shale to a more or less foliated gray or green chloritic or talcose schist, which to a great extent has been metamorphosed to the typical mica schist, the most characteristic and widely distributed of the varieties of the "Cariboo slates."

These rocks to a great extent are highly crystalline, thus distinguishing them from later formations, conform in strike to the general northwest trend, and, being much folded, incline at angles varying from horizontal to vertical. In this excessive folding, from the lateral pressure that has caused this great schistosity, have occurred many fissures or fractures conforming in most part in strike with that of the inclosing rocks in which the large number of quartz veins have been formed, more particularly on the summits than in the lower-lying or valley portions. Dikes of various kinds of eruptive rock are occasionally found.

The possibilities for successful mining may now be outlined.

A.—HYDRAULIC MINING.

First.—In the Quesnelle River district the extensive auriferous gravel deposits in the ancient river system, as yet betrayed only here and there, as at the Cariboo or Horsefly mines, or at those other points where little work other than enough to prove the existence of these gravels has been done, certainly merit careful investigation.

Provided sufficient water can be obtained, as will be discussed below, gravel deposits known to exist almost beyond doubt, both north and south of the Quesnelle River, should be prospected and the rich ground now being opened up in that portion of the channel known as the Cariboo mine should be a very strong incentive, although it does not follow that a deposit of gravel, of this same period found a few miles distant is necessarily part of the same channel or carries any such values as this mine does. However, much of this gravel, explored only in a small way, has proved to carry gold and should be further tested, for with good dumping facilities now there some of these deposits may prove to be very valuable if sufficient water can be brought into these claims, and probably the drainage area available within a radius of twenty miles may supply enough water for five or six hydraulic propositions. Some of the gravel deposits are described below.

Quesnelle Forks, via 150-Mile House, is the chief point in the Quesnelle region.

Second.—In the Barkerville district it is reported by many familiar with the ground that along the creeks from which high values were mined out in early days there remains a large amount of gravel that will pay well if mined by hydraulicking, but,

so far as these creeks are at a relatively high altitude and near the sources of water supply drawn from a very limited drainage area above, the supply of water is here very limited or only available for four to six weeks when the melted snow fills the streams for a short time. For many years hydraulicking in a comparatively small way has been done at several places, while this rush of water lasted, with profitable returns.

It is claimed that a large supply of water might be brought 50 miles, but this would require much capital. In the lower parts of some of these creeks the hydraulic elevator might be used were water more plentiful, and to work over a large amount of gravel in Williams Creek, below Barkerville, the Cariboo Gold Fields is now expending a large amount of money in ditches, flumes, sluices, etc., this company having secured the major part of the water supply of this district.

Annually mining of this kind is done on Grouse Creek, at the Waverly Mine; on the Black Jack, Eye-opener, and Forest Rose, near Barkerville; on Stouts Gulch, Lowhee and Mosquito creeks; while the Chinamen are working some of the benches at several other points and cleaning up a few thousand dollars every year.

Barkerville, chief point—Thirdly.—As the district now under report is only a small part of the Cariboo division, new territory may yet be discovered, especially along the continuation of this gold belt to the northwest.

B.—DRIFT MINING.

In these famous creeks the gold was found at bed rock, sometimes at very little depth, as in the upper part of Williams Creek; but drift mining was almost general, tunnels being run upstream or into the banks to tap the benches on the rims, or shafts were sunk 50 to 125 feet or more deep. Unless drained by tunnels some 2,000 to 6,000 feet long, all mines opened by shafts had to contend with a large volume of water in most of the creeks, and, with excessively high freights and long delays, the miners were thrown back on their own resources and ingenuity, and with very little ironwork at hand it is surprising how cleverly they handled, with really primitive means of overshot water wheels and Cornish pumps, such bodies of water.

With water and much very bad soft or "running" ground or "slum," these men contended against almost insuperable difficulties, but won, and among the Cariboo men was thus trained by hard necessity a band of miners patient, resourceful, and extremely skilled in working the most difficult kind of gravel diggings.

In working down these streams, as on Williams, Lightning, Antler, and other creeks, the gold was found to be in much smaller grains and more widely scattered, and also, as the creeks lost their grade and became wider, the water became far too much for any pumping appliances then to handle, and mining stopped here. Many futile attempts were made to bottom these channels, but water always drove them out, even though large pumps were put in, as at the Kurtz & Lane shaft on Lower Williams Creek.

To-day some of these deep channels are being explored and other enterprises of this character are under way. On Willow River, at the mouth of Mosquito Creek, Mr. Laird has pluckily stuck at his attempt to explore the deep channel of this river, the gutter of which lies nearly 110 feet below the present surface, and this winter, barring mishaps, should know whether gold in paying quantities occurs along the deep bed rock. On Slough Creek Mr. Hopp and Mr. Sargent, for their company, have maintained their struggle to bottom that deep channel opposite the mouth of Nelson Creek.

In this kind of work the gutter or lowest point of the channel is ascertained by sinking a series of holes to bed rock with some form of boring machine, the jetting machine, made by the Aurora Well Works, Illinois, having proved very efficient. Of course it is almost impossible to determine any values that may lie in these deep gravels by means of such small holes, but, having located the deepest point in the cross section, the next step is to sink a shaft in bed rock, so as to get at or immediately below this lowest point or gutter. By doing this work in rock the trouble

of sinking in the soft ground is avoided, and not so much water has to be handled until the gravel is entered and powerful pumps can be installed before the main water source is tapped.

In this manner along many of the famous creeks of this district, such as the lower parts of Willow, Williams, Slough, Lightning, etc., are miles of channel awaiting exploration—it is true that nearly all such ground is now held under mining leases, but with no attempts being made to prospect them—and should any of the above enterprises prove successful, capital will be encouraged to exploit much more of this ground, from which, higher up the streams, so much gold was mined in the early days.

Of course in this work water will be the greatest factor to contend with, but with modern pumps and a lift of only 100 to 300 feet a large volume of water can now be easily handled. In nearly all these channels is a stratum of bowlder clay of greater or less thickness and practically impervious to water, and if mining can be done without piercing this stratum the flow of water to be handled will be much less than otherwise by keeping out the surface drainage.

In the Quesnelle district much interest has been aroused by the exploratory work being done by Senator Campbell near the Horsefly River, where he is sinking a shaft, now 250 feet deep, in the gravels lying in an ancient channel here discovered. Bed rock has not yet been reached, but should this endeavor prove a success the continuation of this channel will be traced; then it should be invariably cross-sectioned with bore holes to find the gutter, as, in the long run, this preliminary will be found to be the most economical, as the shaft can be sunk at the best point.

In sinking the above shaft the flow of water has proved to be very small, the thick stratum of bowlder clay again keeping out surface water. As described below, at the Ward Mine, close by, the gravel bars there have been enriched where the modern Horsefly crosses this channel, leading to the expectation that this deep shaft will prove this channel, now located by holders of mining leases for miles along its supposed course, to be rich enough in gold to permit drift mining with profit.

C.—PLACER MINING.

Placer mining, other than by means of large hydraulic plants for low-grade gravels, is now mostly confined to the work done by the Chinamen, who are taking out a decreasing amount of gold annually, and unless new diggings are found on other creeks, most of which within a radius of this district have been carefully prospected, this class of mining will before long practically cease.

The beds of the various creeks in which gold has been found have been also carefully worked over, except in the very deep and rapid channels, but on the South Fork of the Quesnelle, a rapid-flowing river of size, in which much gold has been found, the Golden River Quesnelle Mining Company, by damming back this river where it flows from the lake, hopes to be able to thus lay bare this river bottom in long enough periods to permit the mining of those parts of it hitherto out of reach.

D.—DREDGING.

Some attempts, with very small success, have been made to dredge the bottoms and bars in the Upper Fraser and the Quesnelle; but as most of this work has been undertaken by inexperienced men, and with forms of dredges now known to be useless, very little of practical value has yet been determined as to the values in these gravels. In most of these experiments the gold-saving appliances, on which success mostly depends, are reported to have been wholly inadequate.

Gold dredging is now being carried on in many parts of the world, with some notable successes, but many failures; but forms of dredges best adapted are now being better understood, and an important article on this subject is appended to this report.

A company was preparing to work on the Fraser, above Cottonwood River, with a

dipper dredge, and another company has declared its intention of putting a number of dredges during the coming year on waters farther north, above Fort George.

There are certainly auriferous bars in many of these rivers, but no reliable data have yet been secured on which to base any further report. In nearly all such enterprises a rapidly flowing current will have to be contended with, also in many cases deep water and bowlders. Suction dredges have been tried, but, as at every other place, these proved to be utterly useless, and, to those interested in this kind of mining, attention can be drawn to the fact that experience now shows that bucket dredges are proving the only device suitable to the raising of gravel of such deposits to the gold-saving apparatus.

E.—QUARTZ MINING.

During this visit a few of the many quartz ledges in these "gold schists," near Barkerville, were examined. Mr. Bowman examined many more and has reported upon them in the Geological Report, 1887, and to this report very little more can be added, as very little work has since been done and nothing of importance disclosed. The discovery of free gold in the decomposed outcrops of some of these ledges has aroused periodic flashes of interest in these leads, but as no shoots of pay ore have been found, this kind of mining has languished and, so far, always ended with no good results.

Although it is a well-known fact that many rich placers have never betrayed the source of their gold, on studying the history of the gold placers formed in the rich creeks that flow down from these mountains, near Barkerville, one can hardly help but believe that this wealth of gold has its source near at hand, and that by the erosion of the veins and stringers in these Cariboo schists this gold was liberated and concentrated in these streams. For one reason coarse gold, much of which was rough and little water worn, has been found in greater or less quantity in nearly all these creeks where they ran down from these vein-crossed mountains, and invariably on descending these creeks the gold became finer in size and more scattered.

Veins.—The following are the chief conditions characteristic of nearly all these quartz veins:

(*a*) These veins to a great extent conform to the strike but not to the dip of the inclosing schists; but this rule is not general, some veins cutting across the schists.

(*b*) The gangue is almost invariably lusterless, barren, milky-white quartz (the same as found attached to the gold nuggets in the placers), often very hackly or easily crumbled.

(*c*) Much of the quartz, as in the large masses, is perfectly free of sulphides, but as a general rule it carries a small percentage of coarsely crystalline iron pyrites, usually along and near the walls, but also in bunches throughout the mass. A little galena is sometimes present, but seldom zinc blende or copper pyrites. The amount of sulphides in some veins is 3 to 6 per cent of the whole.

(*d*) The values of these sulphides when concentrated in gold and silver are often found to be good, but not high.

(*e*) So far no shoot of pay free-milling quartz ore has been found, although on several veins the decomposed top material, very limited in amount, has proved rich, but of many mill tests of ore from many of these ledges, the plates have seldom caught more than $1 to $4 per ton.

(*f*) Some of these veins appear to be traceable by outcrops along the line of strike for 1 or 2 miles, but they are very much concealed by surface detritus and underbrush. These veins are irregular, sometimes swelling out to 20 feet or more in width, as in the B. C. vein, and then fading to a stringer or series of both parallel and ramifying stringers. They are also, near the surface at least, much distorted and often faulted, but often continuous for several hundred feet, maintaining a fair width.

(*g*) Often, in the same gulch or creek, gold of markedly different values was found, gold of a certain grade being confined to a certain section of the channel or bed in the gravel and not much intermixed with that of another grade, very significant of its probable local source.

Again, it is claimed that in some of the creeks where quartz veins were cut across, although to-day little or nothing can be found in such ledges, yet in the placer deposits there was a certain enrichment, often of a gold differing in value from that found in the other parts of the creek bed.

(*h*) Again, it has been found that (*a*) the schists inclosing these veins carry some gold values; also (*b*) that a band or zone of the schists may have a series of interbanded as well as a reticulating system of very small veins or quartz stringers carrying gold and sulphides, very similar to the auriferous schists worked in the Homestake Mine in Dakota. Some work has been done on one of these zones which gave low-grade gold values of $1 to $7 per ton.

Milling qualities.—(*i*) If pay shoots are found and worked, in all probability a certain amount of the gold will be free-milling or amalgamable, while that in close combination with the sulphides can be saved to a great extent when these are concentrated by treating by chlorination or cyaniding, as is now done in so many parts of the world.

As already stated, no shoot of pay free-milling gold ore has been found in the Cariboo quartz veins, but the underground work has certainly not yet been such as to do justice to these prospects, or to absolutely determine that no pay shoot shall be found, as no shaft has reached a greater depth than 180 feet, to show whether in depth values do not increase or the amount of distortion and dislocation lessen, permitting these veins to be more regular. Considerable capital has been expended on some of these claims, but the work done has not been commensurate with the amount of money spent.

It is true that if pay shoots exist here, they might be expected to crop out somewhere near the surface, and the discovery of only one such shoot would at once encourage a far greater amount of thorough prospecting, but it may so happen that only work in depth will yet disclose this desired consummation, and with only a reasonable amount of capital some of these claims can be prospected to a depth of several hundred feet. During the past season, work has been in progress on a number of claims, and M. Emile du Marais, M. E., representing a French company, after securing bonds on a number of properties and the use of the Government testing works, did some work on several claims near Barkerville, especially on one of the bands of gold-bearing schists, but getting results not sufficiently good to induce him to proceed, he has thrown up most of the bonds and discontinued work for the time being; but even this work, unsatisfactory in its results as far as it went, was far from being enough to demonstrate the latent possibilities in these veins or to prove them absolutely worthless.

QUARTZ VEINS.

Mr. Bowman, in the Geological Report, 1887–88, 31–49 C, has described a large number of these quartz leads, as examined by him on Williams, Lowhee, Mosquito, Lightning, Sugar, Grouse, Antler, Cunningham, Snowshoe, Harvey, Duck, and other creeks, Island and Round Top mountains. The writer also visited some of the claims crossed by Williams, Lowhee, and Grouse creeks, Stout Gulch, and on Island, Burns, and Amador mountains.

Williams Creek.—On the Black Jack, in the shaft filled with water, a shoot of ore from which some of the best values had been reported, is said to be faulted, below which fault the vein has not yet been picked up. Near the top of the shaft a tunnel has been run in for a considerable distance in which the vein was seen to be split up into a series of stringers, but it is said some gold is found in the whole mass of vein-crossed schists.

On the Porcupine and Steadman ledges nothing has been done for years, but on the latter a strong vein 4 to 5 feet wide of this very white quartz shows plainly.

Stouts Gulch.—Winthrop claim shows near the small creek irregular veins and stringers of quartz in the schists, and at one place a tunnel had been driven in to tap a large body of this glassy milk-white quartz which had not continued down in depth.

The B. C. Mining Company owns three claims at the head of the gulch on the divide, between it and the Lowhee Gulch, the Cariboo, St. Laurent, and American. This, known as the B. C. vein, runs magnetically east and west, with a dip of 72° N., and is, for several hundred feet, of large width, 100 feet of it being 35 feet wide, of barren-looking, milky-white quartz. For a considerable length it is 15 to 25 feet wide, but again it becomes a mass of stringers in the schists. On the Cariboo claim is the chief work, or a crosscut tunnel 143 feet long, that intersects the vein 53 feet from the surface, where it has a width of 19 feet of the same kind of quartz with a little iron pyrites. From this tunnel extend 170 feet of drifting, which, with three crosscuts, show the vein to be continuous for this distance, with an average width of 20 feet. A shaft from the surface to this drift extends 60 feet below it, with a 65-foot drill hole (diamond drill) in the bottom, all in quartz.

The quartz in this large vein carries from 4 to 5 per cent of sulphides, which, on concentration, are said to have assayed, in making mill tests, over $20 per ton; but, so far, all tests for free-milling gold have been very low, or $1.50 to $2 per ton, and in this large vein no pay shoots or special pay streaks have yet been developed in the amount of work so far done. All the machinery for 20-stamp mill, pans, settlers, three engines, etc., costing $61,000, were brought in over ten years ago, only to be stored away and kept in good order to the present time.

A good site, with a fair amount of water for milling purposes and good timber, is available about 2,500 feet distant.

Last summer, to the west of this tunnel, a number of open trenches were dug to find the continuation of the vein, which becomes much smaller, and holes were sunk with diamond drill, with results not ascertained. Other, but smaller, veins were seen in this gulch.

Lowhee Gulch.—After leaving Stouts Gulch, several claims were seen in this gulch in which old miners claim is a large amount of good ground that could be hydraulicked, as there is excellent grade, but the supply of water is too small to permit other than a small amount of washing in each year, although it is said a fair amount of water can be brought to this gulch by a ditch from Jack of Clubs Creek. The hydraulic leases for most of this gulch are said to be under bond from Mr. Pinkerton to an English company, represented by Mr. Rathbone.

The Goldfinch claim was being exploited by a Vancouver company, and a tunnel being driven to strike a vein was in 100 feet, having cut through several small veins 4 to 8 inches wide and one 2 to 3 feet wide of the white quartz and iron pyrites. Other claims in this vicinity were being tested by this same company.

The Pinkerton claim.—The schists are here cut by many small quartz veins and stringers heavily impregnated with coarse iron pyrites, in the decomposed outcrops of which considerable gold has been washed. A little work had been done, but none of these veins could be traced for more than a few feet before it ended or frayed out into stringers.

Grouse Creek.—About 6 miles east of Barkerville, where much mining was done in the early days, the cleaned bed-rock is seen to be traversed in many directions by a network of veins, but at the head of the creek were seen some large ledges.

Fountain Head.—Here a tunnel has been driven a few feet in a large exposure, 4 to 7 feet wide, of broken, rusty, honeycombed quartz carrying iron pyrites and zinc blende, but in another tunnel, lower down, the vein was only 10 inches wide, if this tunnel has really gone in far enough to strike this vein that here cuts across the schists and slates.

Lord Dufferin and May Flower are old locations farther up the creek, on which a large vein of white quartz and a little pyrites crosses the creek. A tunnel on one side runs about 30 feet northwest, along the vein, 4 to 7 feet wide, until it is cut off by a fault, and a tunnel to the southeast is in over 170 feet following for part of that distance a wide vein of the same white quartz that cuts across the black slate. The vein appears near the face of this tunnel to be split up into stringers, or to have become very small, but the ground is concealed by the timbering. From a 10-ton test lot of this ore Mr. Marsh is said to have got $7 to $8 per ton, no work being done.

Island Mountain.—This mountain, lying between Willow River and Slough Creek and 4 miles from Barkerville, is traversed by a number of veins, upon some of which more or less work has been done, but only recently worked, were visited. However, in the past some very good material has been found on this mountain, the decomposed surfaces of some of the veins carrying considerable gold; but to date, in all the work done—practically little below the surface influences—the veins have been much disturbed and faulted, but they show the same characteristics already outlined, or an irregular persistence along the strike, of the same white quartz with 1 to 5 per cent of sulphides.

Island Mountain Mining Company (President C. T. Dupont, Victoria).—This property consists of three Crown-granted claims, two located along one vein, one along a second.

On the Johns claim are three tunnels, two of which, three-fourths of a mile by wagon road to the stamp mill, are each from 300 to 400 feet long, showing a vein very contorted and irregular in width, of the white quartz and pyrites, for some distance, 2 to 4 feet wide, then a series of stringers, but in one place 7 feet wide, but only for a few feet. The third tunnel, higher up the hill, was a crosscut for 300 feet, wherein it struck the same vein, which carries a good width at one place where an uprise has been made.

No work has been done here for some years, but from some of this ore good assays in gold are obtained, although the ore so far disclosed mills very low, or $2 to $4 per ton.

The claim west of this is owned by a French company, but no work has been done for seventeen years, when over 3,000 feet were done on a vein, from the surface of which gold was washed from the rotten quartz.

Little Giant claim.—A 40-foot tunnel runs in on a barren-looking vein, 2 to 3 feet wide, of white quartz that carries very little pyrites, and 350 feet lower down the steep hillside another tunnel runs for 60 feet along the vein, which is there faulted, and although the tunnel has been extended 500 to 600 feet (without trying to pick up the vein along the line of faulting) the vein has not been found again.

Stamp mill.—This company, aided with a bonus from the Provincial Government, erected, nine years ago, above the stage road as it runs along Jack of Clubs Lake, a 10-stamp mill, consisting of (*a*) Blake crusher; (*b*) two 5-stamp batteries (made by Prescott Scott Co., 1878, San Francisco); (*c*) copper plates; (*d*) four 4 by 12 foot end-shake vanners; (*e*) engine, 15 by 30 inch; (*f*) boilers; (*g*) small pump for raising water from the lake. The buildings and machinery are now in comparatively good condition. This mill was run for a short time without vanners on ore from the claims just described, but with very poor results, and yet, after installing the concentrating machines, milling was attempted only for a short time further, when all work was stopped and the mill has now stood silent for some years.

Burns and Amador mountains, lying between Lightning and Jack of Clubs creeks, and 3 miles from Stanley, the chief town on the former creek, are also crossed by a series of quartz veins much similar to those already described. On the north side of Amador Mountain, or overlooking the valley of Lightning Creek, is a series of veins, some 2 to 5 feet wide in places, on which some assessment work has been done during the past year, the quartz of which is as usual milky white, but with very little sulphide, and showing no free gold, which is only rarely seen in the Cariboo veins. Lack of time prevented the examination of many other quartz ledges, on which little or no work had been done, or none at all for eight or ten years.

SILVER-LEAD VEINS.

During the past two seasons there has been some prospecting done on the Clearwater Lakes, the source of the North Thompson River, the prospectors going from Quesnelle Forks via the Quesnelle Lakes, and a number of claims have been staked off on ledges of quartz and galena carrying silver, from which very good samples were seen.

Water supply.—The future of this district depends now upon two factors: (*a*) the quartz ledges; (*b*) the water supply. Some idea of the former conditions has been given.

In the region about Barkerville the supply of water is not great, for the reason that the creeks, with their gravel deposits, are already situated high up and near the sources of supply, so that only a comparatively small drainage area is available from which the waters may be stored. The elevation precludes the chance of bringing in water from a distance of at least 50 miles, as is claimed by explorers familiar with the region; hence hydraulic mining will not be possible where it is required to be of magnitude to make low-grade gravels profitable.

During the short season of high water all available water is utilized in washing small benches and other diggings, and after this most of the water supply at Barkerville will be diverted to operate the hydraulic elevators on Williams Creek. The summer seasons are usually very dry, so that the supply comes for the most part from the melting snows.

In the Quesnelle region all the possible water privileges or drainage and storage areas where water can be taken at elevations sufficient to be useful in hydraulic mining have been now located except those, if such exist, that are over 20 miles distant from these gravel deposits on the Quesnelle, Cottonwood, and Horsefly rivers. Of these water rights located, probably water enough for eight companies using 1,000 miner's inches may be secured for part of the season, and two, perhaps three, of 2,500 inches and more.

No data as to the average rain and snowfall extending over a number of years exists; but as this region also has many dry seasons, all the rain and snowfall of the fall, winter, and spring months must be stored up in lakes dammed at their outlets or in valleys converted into storage reservoirs. In May and June there is a rush of water in every creek from the melting snows, supplying a good head of water into the month of July, but for the months of August, September, and October the storage reservoirs must then be relied upon to make up the then very scanty supply. This falling off in the water supply in the months best suited to this kind of mining has so far proved very detrimental to hydraulicking, and the progress has not been possible that was at one time expected. In California, before hydraulic mining was restricted or practically stopped, water was brought in ditches and flumes for long distances, as 70 and 80 miles, and even 110 miles, and in this district good water supplies may be found lying farther away, which in time may be brought on to these gravels if development work, so very lacking at present, demonstrates that there are large gravel deposits in the Quesnelle district sufficiently auriferous to warrant such undertakings. The gravel in the Cariboo mine has already proven to be exceptionally rich for the extent and depth it has been tested, but a large supply of water throughout the working season of five months is demanded but has not yet been secured, as a large amount of barren material has to be removed before the mine can be properly and safely opened up to permit the mining of the magnificent deposit of gravel.

If other enterprises are begun, it will not be long before all the water in this district draining from that area above the necessary ditch lines will be stored up. and none whatever will be allowed to go to waste. (From the annual report of the minister of mines, Province of British Columbia, 1897.)

NOVA SCOTIA.

GOLD.

The returns for the year ended September 30 show that 26,579 ounces 19 pennyweights 21 grains were extracted. There are a few returns *not yet* received, which will bring the total up to about 28,000 ounces. *The difficulty* referred to last year in getting prompt returns from *those engaged* in gold mining still continues.

GENERAL STATEMENT FOR THE YEAR ENDED SEPTEMBER 30, 1897.

District.	Number of mines.	Days' labor.	Mills.	Tons crushed.	Average yield of gold per ton.			Total yield of gold.		
					Oz.	dwt.	gr.	Oz.	dwt.	gr.
Wine Harbor	1	1,293	1	611	0	10	9	318	3	2
Gold River	2	829	2	287	1	17	20	542	19	5
Fifteen Mile Stream	1	17,533	2	9,158	0	6	5	2,856	18	0
Stormont	3	43,486	4	28,700	0	0	13	6,209	18	10
Brookfield	1	18,664	1	8,076	0	5	7	3,366	10	0
Caribou and Moose River	5	25,404	4	9,324	0	5	23	2,781	13	19
Uniacke, South and Mount	4	4,985	4	2,344	0	19	9	2,274	4	4
Cochran Hill, Goldenville, and Crows Nest (Sherbrooke)	5	561,110	6	12,659	0	6	13	4,181	18	19
Waverly	1	5,231	1	806	0	13	7	461	8	0
Cow Bay	1	.....	1	717	0	15	15	560	19	19
Tangier	1	4,060	1	372	0	16	2	299	14	0
Central Rawdon	1	13,731	1	963	0	4	3	199	12	0
Killag	1	228	1	112	3	10	8	393	19	0
Montague	2	7,696	3	956	1	0	6	1,177	1	7
Oldham	0	.....	1	308	0	18	17	282	5	6
Leipsigate	2	3,451	2	167	0	7	8	82	7	0
Unproclaimed and others	3	4,554	0	929	0	13	15	625	18	2
Total	34	207,255	37	76,559	.....			26,595	6	21

NOTE.—Additional returns bring the total amount of gold produced during the year to 26,963 ounces 14 pennyweights 2 grains.

GENERAL ANNUAL STATEMENT.

Year.	Total gold extracted.			Stuff crushed.	Year.	Total gold extracted.			Stuff crushed.
	Oz.	dwt.	gr.	Tons.		Oz.	dwt.	gr.	Tons.
1862	7,275	0	0	6,473	1881	10,756	13	2	15,556
1863	14,001	14	17	17,002	1882	14,107	3	20	12,081
1864	20,022	18	13	21,434	1883	15,446	9	23	25,954
1865	25,454	4	8	24,423	1884	16,059	18	17	25,141
1866	25,204	13	2	32,162	1885	22,202	12	20	28,890
1867	27,314	11	11	31,386	1886	23,362	5	13	29,010
1868	20,541	6	10	32,262	1887	21,211	17	18	22,280
1869	17,868	0	19	35,147	1888	22,407	3	10	36,178
1870	19,866	5	5	30,829	1889	26,155	6	13	39,160
1871	19,227	7	4	30,791	1890	24,358	9	9	42,749
1872	13,094	17	6	17,093	1891	23,391	0	0	35,212
1873	11,852	7	19	17,708	1892	21,080	3	18	33,633
1874	9,140	13	9	13,844	1893 *a*	14,030	5	7	28,040
1875	11,208	14	19	14,810	1894	14,980	7	13	39,333
1876	12,038	13	18	15,490	1895	22,112	17	21	58,082
1877	16,882	6	1	17,369	1896	25,596	14	6	65,873
1878	12,577	1	22	17,990	1897	26,579	19	21	76,559
1879	13,801	8	10	15,936	Total	654,446	8	14	1,029,923
1880	13,234	0	4	14,037					

a Nine months only.

PRODUCTION, BY DISTRICTS, FROM 1862 TO 1896.

District.	Tons crushed.	Total yield.			Value at $19 per ounce.	Average yield per ton.		
		Oz.	*dwt.*	*gr.*		*Oz.*	*dwt.*	*gr.*
Caribou and Moose River *a*	96,848	38,024	18	20	$722,473.89		7	20
Montague	21,696	37,894	1	19	719,987.70	1	14	22
Oldham	45,100	48,990	10	18	930,820.22	1	1	17
Renfrew	48,142	33,869	8	2	643,518.68		14	1
Sherbrooke	173,130	123,323	18	8	2,343,154.42		14	6
Stormont	80,316	42,313	19	13	803,965.57		10	13
Tangier	42,720	20,192	17	10	383,664.55		9	11
Uniacke *b*	50,656	35,683	12	8	677,968.72		14	2
Waverly	121,540	60,847	1	2	1,156,094.03		10	0
Salmon River *c*	95,601	39,373	7	18	748,094.37		8	5
Brookfield *d*	14,360	11,534	5	4	219,150.91		16	1
Whiteburn *d*	6,343	9,535	15	18	181,179.97	1	10	1
Lake Cache *e*	20,734	22,757	1	20	432,384.74	1	1	23
Rawdon, East Central *d*	12,158	9,592	7	4	182,254.81		15	8
Wine Harbor	42,711	29,140	8	7	553,667.88		13	5
Fifteen Mile Stream *c*	27,738	15,346	3	5	291,577.05		11	1
Malaga, from 1889 to 1893	18,567	15,180	5	8	288,425.07		16	8
Unproclaimed and other districts	62,522	44,722	10	3	849,727.62		14	7
Total to Sept. 30, 1896	980,882	638,322	12	19	12,128,130.20		13	0

a From 1869. *b* From 1866. *c* From 1883. *d* From 1887. *e* From 1882.

CENTRAL AMERICA.

Data sufficient to enable this Bureau to form an estimate of the output of the precious metals in the Central American States in 1897 have not been received, and it is therefore assumed to have been the same as in 1896.

Respecting gold mining in Guatemala in 1897, Consul H. M. Trayner reports to the British foreign office:

It may be stated, however, that mining as yet has been attended with but small result. The huge barrancos or gorges caused by volcanic action and earthquakes seem to have broken up the veins of the precious metals, and although there is no doubt a considerable quantity of gold and silver in the soil throughout the country, it is not obtainable in any locality in sufficient quantities to give a reasonable return on the necessary outlay. The following particulars concerning the working of the Santa Lucia placer gold mine on the south side of the Motagna River, department of Izabel, may be of some interest:

The property is operated by the hydraulic system, and there are now three monitor nozzles at work.

Water is brought from a distance of 5 miles, with a fall of 150 feet, which gives all the pressure needed.

Thirty cents gold is obtained from each cubic yard of gravel mined.

All the labor is performed by natives, but there is a scarcity of men, about 50 being at present employed. No quartz has as yet been discovered in this district, but prospecting is rendered very difficult by the heavy growth of timber covering the country.

About $50,000 gold (£10,000) has been spent in opening up the country at this mine, *in buying* machinery, building houses, roads, etc., and now there is a thriving little

community of about 200 souls on the spot, with a church, schoolhouse, sawmill, and stores. Extensive improvements are contemplated which it is estimated will cost $150,000 gold, (£30,000) but the facilities which these will yield are expected to repay the outlay, for the district, besides being auriferous, is valuable for farming and in respect of the timber found there.

The following notes are taken from a work on the mineral wealth of the province of Segovia, Nicaragua, by José D. Gomez, in 1894:

"All the towns, all the hills, all the mountains, and all the rivers also in that privileged section (Segovia) contain streaks, veins, and lumps of gold or silver, of copper, of tin, of zinc, antimony, lead and other metals. Nearly all being unexplored, with the exception of Macuelizo and Dipilto, which in times past gave a plentiful yield of silver to the Spanish colonies and that to-day are abandoned because gold is preferred; of the mineral districts of Jicaro, Murra, Los Encinos, and Los Vueltas, where there are no less than twenty mines in exploitation, with six machines of ancient construction for the improving of the gold; of the district of Quilali, whose surface is found sown with streaks and veins, like the preceding; of the district of Telpaneca, which also comprises the minerals of San Juan and El Pericón, where there are twelve mines, which are not worked, actually for the want of resources of the owners; and of the district of the Cuje, where extraordinary riches are encountered, and which are not exploited either, for want of water. Taking as the medium the number of 2 tons, which each machine of the establishments mills (grinds) in twenty-four hours, with an average production of an ounce and a half per ton, it can be calculated that the mines of Nueva Segovia yield a monthly product of 900 ounces of gold smelted, without reckoning the ounces which in the 'smelting' coats the poles or bands of the machinery."

CHILE.

No official information has been received as to the production of gold and silver in Chile in 1897. From the Handels-Archiv, however, for August, 1898, it appears that the exports of silver from Chile, in its various forms, in 1896 amounted to 5,440,978 customs pesos. The Chilean customs peso is equal to 38 pence ($0.77053). This would make the total value of the silver exported, at the average price of silver during 1896, viz, $0.674 per ounce, fine, represent 6,220,233 ounces.

In addition to this, the mint purchased in 1896 406,985 pesos' worth of silver, equal to $148,509, representing 220,340 ounces, fine.

The sum of the exports and the quantity of silver purchased by the mint, viz, 6,440,573 ounces, fine, may be taken as Chile's silver product in 1896, and, in the absence of data for 1897, also for the latter year.

Chile exported in 1896 gold of the value of 849,036 customs pesos of 38 pence, equivalent to $654,208. During the same year the mint purchased 752,031 pesos, valued at $0.3649 per peso, equivalent to $274,416. Assuming Chile's gold product in 1896 to have been equal to its exports of gold plus the amount of that metal purchased by the mint, we find it to have been of a total value of $928,624, representing 1,397 kilograms, or 44,922 ounces, of fine gold.

These figures of Chile's production of the precious metals are merely provisional and subject to future correction.

CHINA.

For a number of years the gold product of China has been estimated by this Bureau as equal to the sum of its exports of that metal in the form of bullion to Great Britain and India. China's exports of gold bullion (inclusive of those from Hongkong) to Great Britain in 1897 were 10,867 ounces, 0.916⅔ fine, or 9,961.416 fine ounces, of the value of $205,921.

The export of gold from China to India in 1897 was 3,014 kilograms, fine, of the value of $2,003,104.40.

The total gold product of China in 1897, therefore, appears as 3,323.842 kilograms, fine, valued at $2,209,025.

This is a considerable falling off as compared with 1896. But China's gold product has always been notoriously irregular, the causes of which are not by any means clear, but may be in part that in some years more of the gold mined is hoarded than in others.

Mr. Alexander Hosie, British consul at Wuchau, in his report to the foreign office on the trade of Fuchow for the year 1897, thus speaks of mining in the district of Ts'ang-wu Hsien, China:

The precious metal is found and worked in two places in this district (Ts'ang-wu Hsien, in which the city of Wuchau is situated), namely. Chin-hsing-wei and Tung-an. It is also known to exist at An-p'ing-ssu, likewise in this district, and on the borders of this and the neighboring district of K'ai-chien, in the Kwangtung province. It is washed on the banks of the Fu River and at Ho-p'ing and T'ai-ping on the banks of the stream which enters the West River at Meng-chiang, in the T'eng Hsien district. It exists in the district of Chao-p'ing and in the subdepartment of En-yang.

Silver is worked at two places in the Kuei Hsien district of the Hsun-chou prefecture, namely, T'ien-p'ing-shan and Sauch'a-shan, at both of which foreign plant is employed. My informant is part proprietor of the mine at the latter place, and he tells me that the silver produced used to be sent to Yunnan to purchase opium, but is now forwarded to Canton. Silver mines were formerly worked within the Ho and Fu-'ch'uan districts of the P'ing-lo prefecture, but work there has been suspended.

Copper exists in the department of Yulin in the southeast and at Hsiang-wu-chow in the Ssu-ch'eng prefecture in the west of the province.

COLOMBIA.

No returns having been received from Colombia for 1897, its gold and silver product in that year is taken to be the same as in 1896, viz, 4,514 kilograms of gold, of the value of $3,000,000, and its silver output, 52,511 kilograms, of the coining value of $2,182,400.

ECUADOR.

The gold product of Ecuador in 1897 may be estimated at 200 kilograms.

No official statement of its silver product has been received since 1893.

Mr. Consul Chambers, at Guayaquil, writes to the British foreign office that a company has been formed in New York to explore the district of Zaruma, and that from the favorable reports which have reached headquarters there is reason to believe that a company will be formed to work the mines in this auriferous district.

The Plaza de Oro Mining Company having spent enormous amounts in developing its property and finding difficulty on account of the great expenses required to carry it on a syndicate of the British shareholders has been formed to continue the works with more economy.

Some of the original works have been shut down, and many of the expenses which had hitherto embarrassed the undertaking have been reduced.

FRANCE.

France produces no gold from its own mines.

In 1896 the silver product of the country was 16,353 kilograms, of the coining value of $679,630.68. In the last report of this series France's silver product in 1896 was assumed to have been the same as in 1895. The data for 1897 had not been received when the present report was sent to the press.

GERMANY.

The answers received to this Bureau's interrogatories respecting the production of gold and silver in Germany in 1897 were as follows:

Gold obtained from the refineries, 2,780.970 kilograms; value, 7,737,485 marks.

Obtained from—	Kilograms.
Domestic ores	112.490
Foreign ores	714.710
Domestic and foreign ores and waste (abfälle)	1,953.770

Silver produced from the refineries of the German Empire during 1897, 448,068.43 kilograms.

Obtained from—	Kilograms.
Domestic ores	171,048.12
Foreign ores	241,812.41
Domestic and foreign ores and waste (abfälle)	35,207.90

Neither all the gold nor all the silver obtained from the refineries of the Empire came from German mines, as is evident from the itemized statement given above. To ascertain what amount of the gold and silver smelted or refined in Germany in 1897 should be credited to that country we must proceed as we did in the last report of this series, and this will be done almost verbatim, it being only necessary to change the figures.

The total amount of gold obtained from the refineries, namely, 2,780.970 kilograms, consisted, first, of the gold obtained from domestic German ores to the amount of 112.490 kilograms. This amount w

certainly obtained from German mines, and must therefore be considered German production. The second item of the total amount refined—that is, 714.710 kilograms—came from foreign gold ores proper imported into Germany and there smelted and refined. This item has been credited to the country or countries that produced it, and to credit it to Germany would be a duplication. It is therefore eliminated from the total German gold production of 1897. The third item—1,953.770 kilograms of gold—was extracted from domestic and foreign auriferous silver and auriferous silver ores. To the extent that this last amount was obtained from domestic auriferous silver or auriferous silver ores it is German production and must be credited to Germany. To the extent that it was obtained from foreign auriferous silver or auriferous silver ores, it is also credited to Germany, not because it was obtained from German mines, but because since it has not been possible to credit it to the foreign countries that produced it, and since it constitutes part of the total gold production of the year, it must necessarily be taken into account in estimating the world's gold product in 1897. It is therefore credited to Germany as a mere matter of convenience of tabulation, but it must be distinctly borne in mind that it is not gold obtained from German mines, whose total gold yield is insignificant.

Bearing in mind the explanation just given, the gold product credited to Germany in 1897 should equal the difference between the total amount refined, viz, 2,780.970 kilograms, and the amount obtained from foreign gold ores proper, or 714.710 kilograms—that is, 2,066.260 kilograms fine, of the value of $1,373,236.

Germany's silver product, from its own mines, in 1897 was 171,048.12 kilograms, of the coining value of $7,108,760.

GREAT BRITAIN.

Respecting the output of the precious metals in Great Britain in 1897, the following communication has been received from the British foreign office:

FOREIGN OFFICE, *September 24, 1898.*

SIR: With reference to the note which I had the honor to address to Mr. Hay on the 8th July last, on the subject of the inquiries made by the United States Treasury respecting the coinage, production of gold and silver, and the currency movements in this country, I beg leave to inform you that in reply to Questions Nos. XII and XIV, I learn from the lords commissioners of Her Majesty's treasury that the weight and value of fine silver and fine gold produced from mines in the United Kingdom in 1897 were as follows:

Product.	Weight.	Value.
	Kilograms.	
Fine silver	7,750	£28,614
Fine gold	53	7,221

The value of the silver is computed at $27\frac{9}{10}$d. per ounce troy, being the average price of standard silver in the London market during 1897.

With regard to Questions XIII and XV of the circular, the lords commissioners of Her Majesty's treasury are requesting the secretary of state for the colonies to ask for returns, which, it is to be hoped, will be available for the information of the United States Government in future years.

I have the honor to be, with the highest consideration, sir, your most obedient, humble servant,

SALISBURY.

H. WHITE, Esq., etc.

The value of the amount of gold given above as Great Britain's production in 1897, expressed in United States money, is $35,141, representing 1,700 ounces fine, or 52.87 kilograms (practically 53 kilograms).

The value of Great Britain's silver product in 1897, in United States gold coin is $139,250 (commercial value), which at the average price of silver during the year—$0.60—represents 232,083 ounces, or 7,220 kilograms, of the coinage value of $300,067.

GREECE.

Greece produces no gold. In 1896 it yielded 32,000 kilograms of fine silver, and it is presumed to have had a like product in 1897, of the coining value of $1,329,920.

THE GUIANAS.

The information regarding the gold industry in the Guianas received from the consul at Demerara is given below.

Mr. George H. Moulton, United States consul at Demerara, British Guiana, has furnished this Bureau with the data of the gold yield of the three Guianas in 1897, which may be summarized as follows: In British Guiana, 127,479 ounces 8 pennyweights 4 grains; in Dutch Guiana, 903.124 kilograms; in French Guiana, 2,313.370 kilograms.

The data relating to the gold product of French Guiana were furnished our consul at Demerara by the French consul at Cayenne.

The 127,479 ounces of gold produced in British Guiana in 1897 is not pure gold. Our consul at Demerara does not state its fineness nor does he give its value; but the gold of British Guiana in past years has been valued at $18 per ounce, and the product of 1897 may be safely valued at the same, which would give the total yield of the colony in 1897 a value of $2,294,622, representing 3,452.636 kilograms fine, at which figures the gold output of British Guiana appears in the table of the world's production of gold and silver in the present report.

Nor is it probable that the gold product of Dutch Guiana in 1897, of 903.124 kilograms, was pure gold. In 1896 Dutch Guiana exported 874.897 kilograms of gold about 0.820 fine. The probability is that the product of 1897 was of this fineness, which would make the amount of fine gold obtained from the mines of Dutch Guiana in 1897 740.562 kilograms, of the value of $492,177.51.

The gold product given above, of 2,313.370 kilograms, in French Guiana in 1897 may be taken as pure gold, of the value of $1,537,465.70. In 1896 French Guiana yielded 3,171 kilograms fine, of the value of $2,107,447, which figure is substituted for that at which it was estimated for that year in the last report of this series.

BRITISH GUIANA.

CONSULATE OF THE UNITED STATES OF AMERICA,
Demerara, April 30, 1898.

SIR: In accordance with the request of the Department of State, dated 12th ultimo, I have the honor to report that no precious metals were produced, either in British, Dutch, or French Guiana, during 1897 except gold. I inclose herewith a report of the gold production in each of the above-named colonies, together with the annual report of the commissioner of mines of this colony and a statement from the consular agent, Cayenne, French Guiana, which may be of interest.

I am, sir, your obedient servant,

GEO. H. MOULTON, *Consul.*

To the honorable the DIRECTOR OF THE MINT,
Washington, D. C.

THE GOLD INDUSTRY IN FRENCH GUIANA.

Gold mining has been the principal industry of French Guiana for many years, and yet its regulations are very imperfect. A few words will give an idea of it.

There is no law to protect the capitalist against the dishonest workman, who can receive advances and break his contract with impunity. There is no controller to prevent the marauders from pillaging the property of grantees, to seize the stolen gold, and oppose them to sell the products of their robbery in the neighboring colonies. For this reason, from the Maroni River, one of our best and largest gold districts, less than one-fifth part of the gold produced comes to our colony, paying a tax of 10 francs a kilogram, when the balance goes to Dutch Guiana free of duties. This is perfectly known, but nothing is done to prevent it.

The interesting question concerning the contested territory between France and Brazil since 1894 has not yet been settled, and the gold diggers working in this part are at the mercy of bandits of all nations.

Strange to be said, we do not possess even an exact plan of our gold districts, and at present concessions are given on lands granted more than twenty years ago. This is because it has been agreeable to one surveyor to declare that the previous plan was not correct, although his plan has not yet been acknowledged by our Government. It is the confusion of "Babel's tower," and God be thanked there are no murders and no crimes to report, owing to the good nature of our gold diggers; but still some improvements would easily bring order and prosperity in our colony, but we ask them in vain.

The quantity of gold produced for 1897 is lower by about 600 kilograms than the year before. From January to the 31st of December the districts have given as follows:

	Kilos.	Grams.
Mana	300	983
Maroni	53	77
Approuague	457	324
Sinnamary	377	239
Roura	106	21
Oyapock	1	736
Contesté	1,016	990

Giving a total quantity of 2,313 kilograms 370 grams.

CAYENNE, *March 31, 1898.*

CONSULATE OF THE UNITED STATES,
Demerara, British Guiana, April 30, 1898.

STATEMENT OF GOLD PRODUCED IN BRITISH, FRENCH, AND DUTCH GUIANAS FOR THE YEAR 1897.

Districts.	Quantity.		
British Guiana:	*Oz.*	*dwt.*	*gr.*
Barima	30,148	3	23
Barama	5,787	6	21
Cuyuni	26,908	14	5
Croete Creek	1,410	8	0
Puruni	6,503	3	15
Mazaruni	2,248	15	23
Essequibo	23,559	0	0
Potaro	30,891	16	2
Demerara	21	19	11
Total	127,479	8	4
French Guiana:	*Kilos.*	*grams.*	
Mama	300	983	
Maroni	53	77	
Approuague	457	324	
Sinnamary	377	239	
Roura	106	21	
Oyapock	1	736	
Contesté	1,016	990	
Total	2,313	370	
Dutch Guiana, total for the colony ... grams		903,124	

DEPARTMENT OF MINES,
Georgetown, Demerara, August 26, 1897.

GENERAL POSITION OF THE GOLD INDUSTRY.

The gold industry has maintained its position very satisfactorily, the amount of gold won and on which royalty was paid during the year being 6,194 ounces in excess of that for 1895-96. Placer mining is being actively pursued in all the districts except the Corentyne and Berbice, and more attention was paid to quartz mining, especially in districts Nos. 2 and 5.

The number of placer and mining claims located up to the 31st October, 1896, increased, as did also the number of prospecting licenses issued and of laborers registered.

MEANS OF COMMUNICATION AND ROADS.

One of the most important events in connection with the gold industry which occurred during the year was the opening in January of the Demerara-Essequibo Railway from Wismar, on the Demerara River, to Rockstone, on the Essequibo, a distance of 18¾ miles, by means of which greatly improved communication has been established between Georgetown and the claims in the Potaro district. A daily steamer proceeds from Georgetown to Wismar and from Wismar to Georgetown, so that it is possible to leave Georgetown at 7 a. m. and be at Rockstone at 4 p. m. The fares charged have been regulated by the court of policy and do not seem prohibitive, as nearly all the traffic to the Potara is via Wismar; only a very few persons traveling by way of Bartica and the falls, which latter danger is entirely avoided by the railway, which comes out on the Essequibo some 4 miles above the highest fall of Ahara.

The construction of the roads, the Potaro-Conawaruk and Barima-Barama roads, has been completed during the year, and they are both of great assistance to the gold industry. On the former road mules and carts are constantly employed carr

ing in the various supplies required by a large number of claims, and it has been reported to me that the men who carry in stores, etc., from the Potara to the claims, perform a journey to and fro, of 15 miles each way, in a day easily.

The Cartabo road has been made for a considerable distance, but what is required in the Cuyuni district, through which the road runs, is a good road made from the river side into the claims at the Quartzstone, Pap Island, and Waiamu sections of the district. The warden finished cutting the trail mentioned in my report for last year, and found that it met the Cartabo road some 14 miles from the Cuyuni and about 18 miles from Cartabo. It bears south and crosses the Oko Creek, a tributary of the Cuyuni, at 10 miles, passing through a somewhat hilly country, with swamps between the hills. It reaches the Mazaruni watershed at 13 miles and crosses the source of the Tupuru, a tributary of the Mazaruni, close to the Cartabo road.

MAZARUNI DISTRICT, NO. 3.

A marked increase in the amount of gold obtained from this district was noticeable at the close of the year, the difference between it and the previous twelve months showing that the output had increased nearly threefold. The respective figures are: 1895-96, 929 ounces 10 pennyweights 5 grains; 1896-97, 2,248 ounces 15 pennyweights 23 grains. Most of this was obtained from the placers of Barnard & Co.

Not much was received from the Caburi Creek, but an increase may be expected when the road to that water course from Bartica town is completed. A sum of $12,000 was voted for the purpose by the combined court at its session in March. A government officer has been appointed for the district, and he is stationed at the old mission at the mouth of the Puruni River.

(*a*) *Puruni River.*—This tributary of the Mazaruni was famous for its gold diggings at the outset of gold digging in the colony. It was almost entirely forsaken in 1891, but is now gradually becoming more frequented, and will doubtless ere long quite recover its original importance as a gold-digging center.

(*b*) On the Puruni the chief centers still continue to be at Mara-Mara and Saparau creeks. Some persons are now working on the China or Chinese Creek, which produced gold freely in 1886-87. No quartz mines have yet been opened in the district.

* * * * * * *

Barama and Barima rivers.—Placer mining in this district showed a considerable decline as against the previous year, but only in the Barima River, the actual figures being 23,476 ounces against 27,352 ounces for 1895-96. The large contribution to the gold output of the district received from quartz mines, however, raised the total production to 30,148 ounces. The hypothecation and sale of gold have been taken advantage of to a great extent in the district, and many companies that used to obtain their stores from Georgetown now deal almost exclusively with the local storekeepers.

* * * * * * *

STATEMENT SHOWING THE AMOUNT OF GOLD OBTAINED IN THE COLONY DURING THE BELOW-MENTIONED YEARS.

Years.	Gold.			Years.	Gold.		
	Oz.	*dwt.*	*gr.*		*Oz.*	*dwt.*	*gr.*
1884	250	0	0	1891-92	110,555	12	5
1885	939	0	0	1892-93	134,124	7	23
1886	6,518	1	12	1893-94	138,527	16	14
1887	10,986	14	0	1894-95	132,994	15	20
1888-89	20,216	1	8	1895-96	121,285	5	7
1889-90	32,332	16	5	1896-97	127,479	8	4
1890-91	66,864	4	21				

(From the Report of the Commissioner of Mines of British Guiana for the year 1896-97, p. 14.)

COMPARATIVE STATEMENT OF GOLD OBTAINED FROM THE BELOW-MENTIONED DISTRICTS DURING THE FINANCIAL YEARS 1895–96 AND 1896–97.

District.	1895–96.			1896–97.		
	Oz.	*dwt.*	*gr*	*Oz.*	*dwt.*	*gr.*
Barima	27,352	19	9	30,148	3	23
Barama	4,708	1	0	5,787	6	21
Cuyuni	28,034	15	0	26,908	14	5
Groete Creek	590	11	0	1,410	8	0
Puruni	6,126	10	18	6,503	3	15
Mazaruni	929	10	5	2,248	15	23
Essequibo	26,848	2	5	23,559	0	0
Potaro	26,651	4	10	30,891	16	2
Demerara	43	11	8	21	19	11
Total	121,285	5	7	127,479	8	4

(From the Report of the Commissioner of Mines of British Guiana for the year 1896–97, p. 15.)

COMPARATIVE STATEMENT OF LABORERS REGISTERED DURING THE FINANCIAL YEARS 1895–96 AND 1896–97.

Station.	1895–96.	1896–97.
Georgetown	8,205	4,853
Bartica	6,743	4,185
Koriabo	1,568	995
Baramanni	1,117	693
Bernice	2	.....
Morawhanna	3	.....
Total	17,638	10,726

NOTE.—The registration of gold-mining laborers by the department of mines was discontinued on October 31, 1896. This explains the large decrease shown above.

The number registered by the Institute of Mines and Forests from November 1, 1896, to March 31, 1897, was 9,219, making the total yield for the year 19,945.

STATEMENT OF GOLD OBTAINED FROM QUARTZ MINES 1896–97.

Mine.	1896–97.		
	Oz.	*dwt.*	*gr.*
Barima Gold Mining Company	6,220	16	19
Barr-Robertson Syndicate	372	18	23
Sir Walter Raleigh Mining Company	78	16	0
Total	6,672	11	18

(From the Report of the Commissioner of Mines of British Guiana for the year 1896–97, pp. 15 and 18.)

ITALY.

According to the official answers to this Bureau's interrogatories relative to the production of the precious metals in Italy in 1897, the gold of Italian extraction was valued at 1,007,477 lire, or $194,443.

There were 237,290 kilograms of silver produced in 1897, valued at 2,291,726 lire, or $442,303 commercial value, representing at the average market price of silver in 1897—viz, $0.60 per ounce, fine—737,172 ounces, fine (coining value, $953,111).

JAPAN.

The production of gold and silver in Japan in 1897 is assumed to have been the same as in 1896, no data on which to base an estimate for the former year having been received.

KOREA.

No answers to our interrogatories regarding the production of gold in Korea in 1897 have been received.

The British consul-general to Korea, Mr. Jordan, writes to the foreign office as follows:

The export of gold dust has risen from $1,390,412 in 1896 to $2,034,079 for 1897, which is far the largest on record. A recent estimate made by an American observer put down the gold annually obtained in Korea at $3,000,000, and as there is reason to believe that the amount which leaves the country clandestinely is at least as large as that declared at the customs, the yearly output is probably not less than $5,000,000. The Wonsan export has remained at practically the same figure for the last two years, just under $1,000,000, the increase for the present year having taken place at Chemulpo, where the export for the year is now almost as large as that of Wonsan, and more than double of the Chemulpo figures for the preceding year.

This is accounted for by the fact that a rich mine was discovered during the summer of 1897 at a place called Ho-Yang, on the plateau between Soul and Wonsan. At one time there were reported to be 40,000 people at the new field, but the number was probably largely exaggerated. Miners were doubtless withdrawn to a certain extent from the old fields in the north, where the production was temporarily arrested.

The total export was divided almost equally between China and Japan, China taking slightly the greater share, whereas in the preceding year Japan was much the larger purchaser. The increased shipments to China are probably due to the continued depreciation of silver, gold being practically the only Korean product that can be sent to China for the purchase of Manchester imports.

It is curious to note that gold dust is a duty-free export, though coal and all other minerals are dutiable. The treaty exempts gold bullion from duty, and any attempt to impose a duty upon dust would doubtless be met by its conversion into bullion.

We may estimate Korea's gold product in 1897 as at least equal to its exports—£150,628, or $733,031, representing 1,102.966 kilograms, fine. The country, probably, produces double this amount, for large quantities of the metal are clandestinely exported, as has been frequently attested by unimpeachable witnesses.

The American gold-mining operations in Korea have assumed important proportions during the past year. The concessionaire, Mr. James R. Morse, having made a subconcession to another American, Mr. Leigh Hunt, this gentleman interested capital to such an extent that the work was placed upon a good footing, and the prospects for the present year are said to be excellent. Ten stamps are being added to the present stamp mill. A new 40-stamp mill is now on its way to the

mines, and large shipments of other mining machinery are being constantly received from America.

Our consul at Seoul, Mr. Horace N. Allen, under date of December 10, 1897, writes as follows relative to this enterprise:

UNITED STATES GOLD-MINE CONCESSION IN KOREA.

Work in connection with the gold-mining concession granted to an American, James R. Morse, by the Korean Government is progressing favorably. The district is one of some 25 miles in width and includes the country reputed to be the richest in gold of any in Korea. The concession is for a period of twenty-five years and is very favorable, including the right to mine any other minerals found in the district. Mr. Morse has granted a subconcession to another American, Mr. Leigh Hunt, who has succeeded in interesting American capital to such an extent that the subcompany is about to discard the obsolete and unsatisfactory mill sent to the Korean Government ten years ago by a San Francisco firm, and will shortly install in its place a modern and carefully selected mill of forty stamps. As yet, not much has been done beyond what might be called prospecting on a large scale; but veins of medium-grade ore have been opened, which give good prospects.

The whole country has been, as it were, honeycombed by native miners in the past, and, to please the native miners and promote further prospecting, these people are given mining rights for one year on new properties. The Korean miners are said to be entirely satisfactory. They are patient, strong, enduring, and very easy to deal with. Their wages are about 40 cents per day in silver (equal to about 20 cents in gold), and the supply is ample. The company is on good terms with the people, and life and property are perfectly safe at the mines.

The placers have been well worked over upon the surface, but the natives have not been able to get down very deep, and bed rock has not been reached. The native method of working the quartz veins is to chip out the gold-bearing rock with their soft iron tools as much as possible, after which they fill the hole with fuel and set fire to it. When the rock is as hot as it can be made they pour in water, which cracks the surface so that they can chip it off. The ore thus obtained is then crushed on a flat rock by huge stone rollers worked by many men with poles. Water is the worst obstacle the native miners have to contend against, since their only way of emptying a shaft is by bailing it out with gourds, which are filled and passed up from man to man. When permanent water is reached the shaft has to be abandoned; and, as the veins usually grow richer as this condition is approached, the natives declare that, if they only had some means of getting rid of the water they would be quite satisfied.

So far, the machinery sent here from the United States for the American company, as well as for the Korean Government, has proved to be so poor as to cause the greatest dissatisfaction on the part of the engineers. After waiting a very long time for a pump, I am told that they received one from San Francisco that "should have been sold for old iron." Certainly, if this be not an exaggeration, it shows a very short-sighted and reprehensible policy on the part of certain manufacturers. I believe the result is that further machinery is to be obtained from Chicago.

At present, there are eight Americans employed at these mines in directing the native workmen and running the machinery.

By later grants, standing timber is allowed to the company at the rate of 60 cents silver (30 cents gold) per cord; and, as there is an ample growth of scrub trees on the mountains, the item of fuel for the mills is satisfactorily settled. The company will introduce some rough forestry methods to protect the young trees, which are annually damaged very greatly by fires carelessly started by the country people. There is some large timber near by, from which the company have finally obtained permission to cut trees for material for the new mill, thus saving them very great inconvenience in transportation, as they are about 150 miles from the port of entry—

Peng Yang. At present, everything has to be transported this distance upon the clumsy bull carts of the country; but some large American wagons are now ordered, and, as the road is passably good at most seasons, it is thought that this matter of transportation will not be so serious in the future as it has been in the past. Bicycles are in great favor for rapid runs to and from the mines, and the Government telegraph line is not far distant from the mining district.

The Germans have obtained a mining concession for a small portion of the district adjoining the one held by our people. The terms of the German concession were made as nearly like those of the American as the Korean Government would allow. This property is soon to be developed, I am told. The concession for a railroad from Seoul to the northwest border, granted to a French syndicate, gives them the right to open certain mines as well; and, as it is generally known that Russia is interested in this proposed railroad, it is pretty sure to be built. The road will be something under 500 miles in length and will run through this whole mining region, which lies on the line between Seoul and the border city of Weiju, where the proposed railroad will connect with those about to be built in Manchuria. These, with the American railroad now building between the capital, Seoul, and its port, Chemulpo, will give Korea and its chief port and capital, as well as these mining regions, direct connection with Europe.

HORACE N. ALLEN, *Consul-General.*

SEOUL, *December 10, 1897.*

(From Consular Reports, March, 1898.)

MEXICO.

For a great number of years it was the custom of this Bureau to estimate the gold production of Mexico in any given year by adding the gold coinage of that Republic to its exports of gold in the various forms, except the exports in the form of foreign and domestic coin.

The foreign gold coin was excepted because it could not possibly have been of Mexican production during the year under consideration, and the Mexican gold coin, because the exports of it were already embraced in the item "gold coinage."

Following this method, the gold product of Mexico in 1897 would be calculated as follows:

Gold coinage	$417,176
Gold in ore, dust, etc	365,226
Gold bullion	6,220,765
Cyanide of gold	226,986
Sulphide of gold	33,916
Total	7,264,069

The gold that came to the United States from Mexico in 1897 was as follows:

Gold from Mexican ores, obtained in United States smelting and refining establishments	$5,527,897
Mexican gold bullion deposited at United States assay office, New York	760,392
Mexican gold bullion deposited at San Francisco mint	476,072
Total	6,764,361

By adding Mexico's gold coinage in 1897, viz, $417,176, to the above *$6,764,361*, $7,181,537, representing 10,805.803 kilograms, is obtained,

which, of itself, is a closer approximation to the Republic's gold product in 1897 than can be obtained from the Mexican figures.

But a closer approximation still may be reached.

Mexico exports considerable quantities of gold ores, bars, etc., not only to the United States but also to France and England. No statement of the exact amounts shipped to the two latter countries in 1897 has been received by this Bureau, but, basing an estimate of the same on the amounts exported thither in previous years, they may, it is believed, be safely assumed as equal to a minimum of one-third the amounts exported to the United States, and that the fine gold they contained was equal to one third the amount extracted from Mexican ores, etc., in the United States.

The United States received from Mexico in 1897 $6,764,361, one-third of which is $2,254,787. Adding this amount to $7,181,537, obtained above, gives a probable gold product of Mexico in 1897 of $9,436,324, Mexican gold currency, corresponding to 14,198.501 kilograms, fine, at which figures the gold product of Mexico in 1897 appears in the table of the world's production in the present report.

The product of silver in Mexico in 1897 consisted of the following items:

Silver coined	$19,608,459
Silver ore, dust, etc., exported	11,401,176
Silver in slag exported	39,800
Silver bullion exported	35,775,125
Silver in cyanides	123,246
Silver in sulphides	1,663,581
Total	68,611,387

Representing 1,676,925 kilograms at the Mexican coining rate for silver of 40.915 pesos per kilogram.

The following correspondence relative to the amount of precious metals from Mexico deposited at the New York assay office and the San Francisco mint explains itself:

UNITED STATES ASSAY OFFICE AT NEW YORK,
Superintendent's Office, September 7, 1898.

SIR: In compliance with request contained in your letter of the 6th instant, I herewith transmit a statement showing the amount of gold and silver bullion and coin deposited at this institution from Mexico during the calendar year 1897:

Deposits.	Gold.		Silver.	
	Standard ounces.	Value.	Standard ounces.	Coining value.
Bullion	40,871.068	$760,391.96	581,967.14	$677,198.13
Coin	16,393.136	304,988.56	2,115.14	2,461.25
Total	57,264.204	1,065,380.52	584,082.28	679,659.38

Respectfully, yours,

ANDREW MASON, *Superintendent.*

Hon. GEO. E. ROBERTS,
Director of the Mint, Washington, D. C.

THE MINT OF THE UNITED STATES AT SAN FRANCISCO,
Superintendent's Office, September 7, 1898.

SIR: Replying to your telegram of the 6th instant, I beg to report that the gold and silver bullion and coin from Mexico deposited at this mint during the calendar year 1897 was as follows, viz:

	Standard ounces.
Gold bullion	25,588.868
Silver bullion	18,933.820
Gold coin	1,850.597
Silver coin	None.

Very respectfully,

FRANK A. LEACH, *Superintendent.*

Hon. B. F. BUTLER,
Acting Director of the Mint, Washington, D. C.

THE YAQUI GOLD FIELDS.

Of late the press has contained many notices of this country, and gold seekers, discouraged by the rigors of an Alaskan winter, have turned to the Yaqui country to prospect for the treasure. For the past few months as many as twenty prospectors each week have fitted out in El Paso, Tex., and departed over the Rio Grande, Sierra Madre and Pacific road for the Yaqui territory. Reports coming back from them have been generally favorable. A few days ago a rich vein was struck near Guaynopa, which runs 8,000 ounces of silver and 11 ounces of gold to the ton. But, however rich the deposits may be, I would not recommend that anyone seek his fortune there with a mere pan and a pick. There is, without doubt, considerable gold there, but, to be worked profitably, plenty of capital and the most improved machinery are requisite.

The Yaqui gold country is reached by taking the Rio Grande, Sierra Madre and Pacific road at Ciudad Juarez, Mexico, for Casas Grandes, 150 miles to the southwest. From Casas Grandes to Sahuaripa, in the State of Sonora, on the eastern edge of the gold fields, the distance is 140 miles via the following points: San Diego ranch, Colonia Pacheco, Colonia Garcia, and Chuachupa. Wagons can be used as far as Chuachupa, and the roads are tolerable. From this last-named place to Sahuaripa the distance is 55 miles, over a new mountain trail. The burro is the only means of transportation.

After winding among the defiles of the mountains, the prospector will enter the valley of the Yaqui River. Many extravagant stories have been told of the existence of placer and quartz gold in this valley. The Yaqui Indians have extracted gold in meager quantities. Until recently the admission of miners to this territory was denied by the Indians, and this probably caused the exaggerated reports about the deposits of the precious metal. Until lately the Indians rebelled against certain laws of the Mexican Government, but now a treaty with them is in effect, and they are peaceable. For many years the Indians have sold gold to traders, but it has been impossible to determine how rich the deposits are. As I stated above, it will require plenty of capital to mine it profitably.

It is a virgin country from Casas Grandes to the gold fields. Plenty of deer, bear, and turkeys can be found to supply the traveler with fresh meat. Springs and small streams of fresh water are numerous. As far as Chuachupa corn, flour, potatoes, and other necessaries can be purchased from settlers.

Prospecting in the Yaqui country is relatively cheap. Everything purchased is paid for in Mexican money. The climate is healthful, and work can be prosecuted for 365 days in the year.

The mining laws of the Republic of Mexico insure the prospector full protection and enjoyment of anything valuable he may find. Under the present law, with a small expense for "denouncement," three months are given the miner to ascertain

the value of his find and acquire the ground if its importance may warrant. The yearly taxes are $10 per claim of 2½ acres, and the property is held without further obligation on the part of the owners.

CHARLES W. KINDRICK, *Consul.*

CIUDAD JUAREZ, *January 25, 1898.*

(From Consular Reports, March, 1898.)

NORWAY.

Norway produces little if any gold. Its silver product was estimated by this Bureau to have been 5,046 kilograms, fine, in 1896, and is assumed, in the absence of any data for 1897, to have been the same in the latter year.

PERU.

It has not been customary for the Government of Peru to keep official statistics of the production of gold and silver. The silver product of 1896 was estimated as equal to the sum of the amount deposited at the Lima Mint for coinage and the amount registered at the same mint for export, a total of 70,122.473 kilograms, fine. During 1897 the export duty previously existing upon gold and silver was removed and the mint was closed to the free coinage of silver, so that these figures are no longer an accurate criterion by which to judge of the country's production. The United States minister at Lima returns an estimate furnished by Mr. Alejandro Garland, a Peruvian writer of high repute upon financial and economic questions. He estimates the gold product of Peru in 1897 to have been 945 kilograms, fine, of the value in United States gold coin of $628,047. The silver product he estimates at 304,400 kilograms, fine, of the coining value, at the ratio of 16 to 1, of $12,650,864.

The estimate as to silver is given with some misgiving as to its accuracy, as it indicates a very much larger product than Peru has ever heretofore been credited with for one year. We are the more doubtful of the figures as to silver from the fact that the American minister, Mr. Dudley, in making the returns, says there has been an increased production of gold but a falling off in the production of silver. The last statement is inconsistent with the estimate made by Mr. Garland of the silver product.

NOTES ON THE PHILIPPINE ISLANDS.

Ambassador Hay sends from London, under date of May 18, 1898, a pamphlet written by Mr. Frank Karuth, F. R. G. S., entitled A New Center of Gold Production, describing conditions in the Philippines. Mr. Karuth, who is president of the Philippines Mineral Syndicate, Limited, says in the letter to Ambassador Hay, accompanying the pamphlet:

These notes were written in 1894. Since then the exploratory work under my direction has been carried on as vigorously as circumstances permitted. At all events, extensive auriferous ore deposits have been opened up quite near the sea,

assuring a large output for many years to come. Also, the continuation of the auriferous formation has been proved over a wide district.

The complete absence of practicable roads throughout that district, and, indeed, throughout the islands, must at first confine mining operations requiring heavy plants to points near harbors or navigable rivers. But such points, I venture to say, are numerous enough to give rise to prosperous industry. I know of no other part of the world, the Alaska Treadwell mines excepted, where pay ore is found within a few hundred yards of the anchorage of seagoing vessels. So far the fringe only of the auriferous formation has been touched. There is no brook that finds its way into the Pacific Ocean whose sand and gravel do not at least pan the color of gold. Heavy nuggets are sometimes brought down from the sierras, where, I believe, there are promising fields for hydraulic mining. Alluvial gold is also got in the island of Mindanao, especially in the districts of Surigao and Misimis, on its northern coast. Extensive deposits of copper ore occur in Luzon, which will probably prove remunerative when means of transport have been devised.

Galena, both auriferous and argentiferous, is found in veins in Luzon and Cebu, sometimes accompanied by zinc blends.

I do not know of the occurrence of true coal in the islands. The beds which have been intermittently worked in the islands of Cebu and Masbate consist of lignite of very good quality. Some years ago large outcrops of such coal were found near the beach in the island of Masbate, but most of it which could be got without mining has been removed for the use of interinsular steamers. One of the syndicate's engineers, a man of experience as manager of coal mines in Lancashire, found Masbate coal quite useful for steamers. He calculates the quantity of coal available in a concession of about 60 acres at 1,200,000 tons. The Masbate beds are so tilted as to form an angle of 70° with the horizontal.

I have also evidence of the occurrence of gems in an upper valley of the sierra. One of the engineers observed in a sample of roughly washed alluvial gold brought down by the aborigines certain small stones, which, on examination in the Schools of Mines in Kensington, were found to be rubies and hyacinths. I was unable to detach a party for the examination of the locality, but I have marked it.

We were at no time in want of labor at cheap rates, though at times we employed several hundred men. The Bicol miners are adepts by atavism in their work, and soon adapt themselves to European methods. On the whole, the general conditions for mining enterprises are exceptionally favorable.

Extracts from the pamphlet are given below:

A NEW CENTER OF GOLD PRODUCTION.

It is not improbable that ere long we may have to reckon with these islands in the far East as factors in the world's gold production. That the precious metal is widely distributed in the archipelago is known to all who know a little more of it than its name, but they are few in number. Few also are the sources whence information can be drawn. Not five books in the English language are worth consulting about them. Crawford's History of the Indian Archipelago, published early in this century, is still the student's tex-book. Whatever has been published since then, when it rises above the level of a mere traveler's tale, is either not comprehensive or not reliable. The work of Jagor, the German naturalist, of which there exists a fairly good English translation, is rough and fragmentary, and not rarely wrong in its generalizations. * * *

The number of the islands which form the Philippine Archipelago will astonish many readers. It is said to approach two thousand. There are two among them larger than Ireland, namely, Luzon with 42,000, and Mindanao with 38,000 square miles; and there are other islands with 5,500, 5,000, 4,500, 4,000, 3,500, and 3,000 square miles. * * * The character of the fauna and flora of the Philippine Islands is, to a certain extent, of the Melanesian or Australian type, and differs widely from

that of the Malayan Archipelago, from which it is separated by a narrow but very deep strip of sea. The Philippines rejoice in that distinctly Australian bird, the cockatoo, as an indigenous member of their avifauna, and in the entire absence of the tiger or any other representative of the large *Felidæ*. There are reasons for the hypothesis that the Philippine Islands are peaks, mountain ridges, and table lands of a submerged continent, which in a very early geological period extended to Australia.

The geology of the Philippine Islands is to a very large extent a mere matter of conjecture. Their conformation and the exuberantly luxurious tropical vegetation render surveys and explorations more than ordinarily difficult. Only a few districts have been cursorily surveyed and reported on. * * *

The active operations of the Philippines Mineral Syndicate are at present confined to a district in the eastern part of Luzon, where the following formations have been observed, viz: Groups of chloritic slates, diabase and gabbro, Eocene limestone, and recent formations with marine fossils.

Almost everywhere in the islands are the results of volcanic forces in evidence, although the number of active volcanoes is small. The volcanoes, active and extinct, are grouped in two lines, running, approximately, east and west. Earthquakes are not infrequent, and the buildings are designed to resist them. The more violent seismic disturbances appear to be confined to certain centers, among which the neighborhood of Manila, the capital of the islands, situate in Luzon, seems to be prominent. The mining concessions of the Philippines Mineral Syndicate, Limited, of London, which are scattered over an area of several hundred square miles in the east of Luzon, have in two years been visited by only one very slight shock, which passed off without the smallest inconvenience or damage. The orography of the group is very complicated. In a general sense the direction of the chains of mountains is north and south, with occasional deflections to east and west. The highest mountain in the group is Apo, in Mindanao, with over 9,000 feet, while Halcon, in Mindoro, reaches nearly 8,900 feet, and Majon, in Luzon, exceeds 8,200 feet.

The archipelago lies between 4.40 and 20 north latitude and 116.40 and 126.30 east longitude. The seasons are divided into hot and cool, or wet and dry, and vary according to the aspect of the country. Regions exposed to the southwest monsoon have their wet season, while on the other side of the mountains people enjoy the dry season. The rainfall is not excessive for the Tropics, nor is it continuous, for occasional breaks lessen the discomforts of the wet season. The climate is very healthy for the Tropics, and diseases—e. g., yellow fever—are unknown.

The bulk of the natives are of a race akin to the Malays, though pure Malays are only settled on the south coast of Mindanao and the neighboring islands, where at times they give a little trouble to the authorities. In the interior of Luzon and some of the other islands the remnants of a race of natives of undoubtedly Papuan origin are found, still as untamed and given to roving through the forests as the Spaniards found them over three hundred years ago. They, like their Australian kinsmen, fly from civilization and succumb when forced into contact with it. A very interesting account of the inhabitants is given by Mr. Palgrave, late Her Majesty's consul in the Philippines, in an article in the Cornhill Magazine, entitled "Malay life in the Philippines."

Mr. Palgrave speaks in glowing terms of the fertility and beauty of the eastern isles. * * * "Dull indeed," he says, "must be his soul, unsympathetic his nature, who can see the forests and mountains of Luzon, Queen of the Eastern Isles, fade away into dim violet outlines on the fast receding horizon without some wistful remembrance, some pang of longing regret. Not the Ægean, not the West Indian, not the Samoan, not any other fair island cluster * * * can rival in manifold beauties of earth, sea, and sky the Philippine Archipelago. Pity that for the Philippines no word limner of note exists. The chiefest, the almost exceptional, spell of the Philippines is situate, not in lake or volcano, forest or plain, but in the races *that form the bulk of the island* population. I said 'almost exceptional,' because

rarely is an intratropical people a satisfactory one to eye or mind. But this can not be said of the Philippine Malays, who, in bodily formation and mental characteristics alike, may fairly claim a place not among the middling ones merely, but among almost the higher names inscribed on the world's national scale. A concentrated, never-absent self-respect, an habitual self-restraint in word and deed, very rarely broken except when extreme provocation induces the transitory but fatal frenzy known as 'amok,' and an inbred courtesy, equally diffused through all classes, high or low, unfailing decorum, prudence, caution, quiet, cheerfulness, ready hospitality, and a correct though not inventive taste. His family is a pleasing sight—much subordination and little constraint, unison in gradation, liberty not license. Orderly children, respected parents, women subject but not oppressed, men ruling but not despotic, reverence with kindness, obedience in affection—these form a lovable picture not by any means rare in the villages of the eastern isles. The villagers' houses, some large, some small, wood or bamboo, two-storied or one, mere huts or spacious dwellings, according to the fortunes of the inmates, are dotted here and there in an unsymmetrical row among the trees; but all have a comfortable, a cosy look suggestive of sufficiency; many of them white, painted with stripes green or blue, rarely red, and occasionally a flower pattern or fanciful scroll work to enliven them more. Eight million natives, more or less, inhabit the Philippines, and yet scarcity is of rare occurrence; famine unknown. * * * Of all tropical lands, all tropical races, it has been my lot to visit, none will have left a pleasanter or more heart-satisfying memory than the Philippine Archipelago, the home of the half-civilized Malay."

* * * * * * *

The Philippine Islands are under the supreme charge of a governor-general, who resides in Manila, a town of considerably more than 300,000 inhabitants, among them a goodly number of British men of business, whose well-appointed club is the center of foreign and social intercourse. In Madrid the interests of the colony are specially intrusted to a council of state for the Philippines, which acts as an advisory body to the minister of the colonies. There is also a council of state in Manila, which has a voice in questions affecting the material progress of the islands, which are divided into provinces, each under its governor. The provinces are subdivided into districts, and these again into communes or parishes. The gobernadocillo (little governor) stands on the lowest rung of the official ladder, being the elected head of a commune, and wearing as the symbol of office a stiff, mushroom-shaped hat, resplendent with solid ornaments of silver bullion. In these communes or parishes the cura (priest), especially if he be a Spaniard, as is generally the case in the more important parishes, exercises supreme power. He is the father and councilor of his people, and helps them not only with spiritual advice, but also furthers their material interests. Many of these Spanish curas have done much good work in the way of making roads and bridges and the building of churches, acting frequently as their own engineers and architects with far less unsightly results than one might expect from persons who are supposed to be more conversant with breviary and rosary than with rule and compasses.

The Spanish priests, friars of strict orders, come to the islands for aye and good, and, with scarcely any exception, do their duties faithfully and devotedly. Priests of native extraction do not quite come up to the high standard of their Spanish confratres. They can not all live up to the severity of monastic rules. These native curas, moreover, suffer under the proverbial disadvantage which affects the prophet in his own country, and, lacking the strength of mind and tenacity of vow of the Spanish priests, sometimes seek consolation in diversions of not quite a clerical or monastic character.

* * * * * * *

On the whole, the Philippine natives find and take life easy. Their requirements are few. The sum of £5 will provide a native household with a dwelling of its own and ample furniture. Under a genial climate, on a soil lavishly grateful for the

slightest tending, by waters teeming with fish, they know naught of hunger, and have much time left for amusements—such as dancing and public rejoicings on the smallest occasion, music, for which they have a natural talent, so that there is scarcely a commune without a fairly trained brass band—and gambling. Cockfighting is the national sport, and no mean source of revenue to the authorities. Almost every native owns a fighting fowl, which is as dear to him as her lapdog to a European lady. He carries it about with him and bets his bottom dollar on its performance in the arena. Thus the native is an intermittent rather than a steady worker, and his delight in feasts and holy days, and his content, which passes him off as rich in his own mind with $10 in his purse, make him as a laborer, docile as he is and willing to please, a source of frequent annoyance to his employers.

After this slight sketch of the country, its institutions and inhabitants, a glimpse may now be taken of mining matters. * * * Proceeding in the order of seniority, also in that of widest distribution, gold mining will take the first place.

There is no doubt that mining for the precious metal was practiced in the islands long before the advent of the Spaniards.[1] In fact, it may be that the alluvial deposits, accessible to the Chinese and Malay traders, who had intercourse with the islands long before they were known to Europeans, have been to a great extent worked over and over again. The tools which the natives use—a washing board and a wooden bowl—are of great antiquity, and form a prominent feature in the household utensils of all native villages in the auriferous regions. * * * Bowlders and fragments of quartz with visible gold occur in many alluvial deposits in the islands, and it is not likely that the natives would have thrown them aside without endeavoring to extract the gold. This they probably did, as they do it even now, by pulverizing the quartz by hand and washing it like they wash the auriferous gravel and sand. The only improvement on this rude process was the introduction by the Spaniards in some districts of the Mexican "arrastra," a block of rock moved by buffalo power like a millstone on a nether block. The charge of an arrastra is about 250 pounds. Float gold and auriferous pyrites are lost in the process. It is doubtful whether to this day the natives aware are of the auriferous character of the pyrites, which almost always accompany the auriferous quartz, sometimes in not inconsiderable proportions.

Thus the production of gold by washing alluvial deposits and pounded quartz is an old-time industry in the Philippines, followed to these days by nearly all in the auriferous districts in a desultory way when the sowing is done or the rice harvests gathered; when the overdue capitation tax, or an approaching holiday, with its cockfights, makes the possession of a few dollars in cash more than usually desirable. Mr. James Hilton, M. E., who visited Luzon in 1890–91, and Mr. George Simpson, a veteran Ballarat gold-mining captain, who arrived there in 1892, give in their reports interesting details regarding native mining methods, some of which are worth mentioning. Mr. Hilton says: "The occurrence of valuable mineral deposits in the Philippine Islands is well known, and it might be supposed that the colonists would endeavor to profit by the wealth which nature has placed at their disposal, the more so as the mining laws of the land are liberal, the taxes the reverse of onerous, and the conditions generally favorable. Nevertheless, as a matter of fact, mining, as the skillfully and intelligently conducted industry that we know elsewhere, does not exist in the Philippine Islands. * * * I was taken to see a vein of gold quartz, but found the shaft full of water, and ascertained the only means of draining it was by a posse of seventeen natives, who, forming a chain, handed palm-leaf buckets from water level to surface. The only means of crushing the gold quartz was a ponderous stone moved by buffaloes. Amalgamation is not known. The stuff is

[1] NOTE (by Mr. Karuth).—Dr. von Moellendorff, an expert sinologist, and formerly German consul in Manila, has informed me that he has a Chinese book in his possession, dating from about the third century A. D., in which a trading voyage from Amoy to Manila is described. Gold is mentioned as *the chief product of Luzon*, and names occur which are still recognizable in the present nomenclature *of Luzon.*

washed in wooden bowls, and it takes at least 400 of them to deal with a ton." * * * Describing the working of a mine at Mambulao, in the Island of Luzon, Mr. Simpson observes: "The Indian miners' mode of operations was based on sound engineering principles in so far as draining is concerned, as shown by their putting in the to them very costly adit from the creek at the foot of the hills on which the mines are situated. They bailed the water out with small buckets, holding from 2 to 2½ gallons each, and by literally filling the various shafts with men, who passed the buckets from one to another, they managed without either powder or dynamite, or any other explosive, to realize some thousands of ounces of gold. This is the barbarous method adopted."

* * * * * * *

By preference the native miners work where bailing is not necessary, but such opportunities are not frequent. When they occur, the natives make the most of them. Mr. Carnegie Williams, the able general manager of the Philippines Mineral Syndicate, reports that in one case the natives have removed an entire hillock down to sea level. They must have dealt with immense quantities of paying quartz, for they remove nothing that does not pay them. This hillock, to judge by the general conformation of the mountain ridge, of which it formed part, must have been at least 400 feet high and correspondingly broad. Spaniards and Spanish companies, in most cases with absurdly inadequate capitals, have also worked in the district, but in all cases without pumps or any other machinery than the time-honored "arrastra." They never dealt with pyritic ores, but treated the quartz only for its free gold. In one instance at least, that of Mambulao, their workings assumed important dimensions. Mambulao means in Bicol language the "Place of gold," and certainly the precious metal is strongly in evidence in the district. Here a vast adit, opening near the sea in solid masonry, has stood the neglect of decades, and may probably be made useful again by the present proprietors of the mines. Record has it that when they flourished, the weekly sales of gold amounted to over 1,000 ounces, all produced in the primitive way, by washing the pounded quartz.

* * * The most serious impediment to mining in the Philippines is the utter absence of practicable roads. The natives, with their primitive ways of working, do not feel the want of roads. They trudge contentedly single file, laden with their simple implements, through the trackless primeval forests, cutting their way patiently through endless tangles of lianas and swaying labyrinths of luxuriant greenery, which would make a botanist's heart swell. In many parts vehicles of any kind are unknown; in others, their only representative is the creaking country car drawn by a pair of stolid buffaloes.

The engineers of the Philippines Mineral Syndicate were driven to many odd shifts when moving heavy machinery from the port to the syndicate's chief establishment. In the first place, a road had to be made, and, though it is barely 3½ miles long, half a dozen bridges had to be built, roughly, yet strongly enough to bear the weight of many tons. And when the road was ready, native carriers asked absurd sums for the conveyance of a couple of boilers, weighing 4½ and 3½ tons, respectively. In the end a simple sledge, devised by British ingenuity, did the job for a small fraction of the sum asked by the natives. * * *

Thus far the fringe only of its particular district has been investigated by the Philippines Mineral Syndicate. Also, another district, hundreds of miles away from the syndicate's chief establishment, has been examined, with the result of finding an extensive alluvial gold field at the foot of the mountains. There, also, the natives have worked in their usual fashion, riddling in places the ground like a sieve with their pits. It is well known that the natives in the mountains, which to a great extent are unexplored, all traffic in gold, and from the general evidence it seems probable that the auriferous formation, from which the alluvial deposits were stocked by the process of erosion, continues throughout the backbone of the island. But for practical purposes British mining enterprise must keep near the coast for years to come, until, in the progress of events, more distant mines can be reached with convenience.

The question is often asked: "How is it that so little is known of Philippine gold?" The answer is simple. There is no official control of the output, or tax on it. The miners live in isolated districts and villages, with rare communication between them. And the universal man of business is the omnipresent Chinaman, now storekeeper with a fixed abode, now perambulating peddler, who penetrates the most distant settlements, buys the gold with his wares, and sends it out of the country—over to Hongkong or Amoy, or elsewhere. It is not his business to swagger over the volume of his trade; in fact, he keeps it dark. Those who know are aware that the gold export is considerable and very much exceeds the official computation, whatever that may be. "Paracale" gold is well known in Manila, but few Manilese know where Paracale is, and still less have ever visited the place. Yet it is a prosperous village, with a good deal of trade and a large native mining population. * * * The Paracale gold dust is melted into tiny ingots, a small bivalve serving as mold, so that the gold shows the shape of the shell. These tiny ingots are tested by the Chinese purchaser, the traces of whose probing auger are always in evidence on the ingots.

Gold is found in many other islands of the group. Señor Abella found traces of alluvial workings in Cebu. Mindoro, which is but little known, is said to be rich in gold. Panaon, a small island north of Mindanao, has at least one well-defined vein of auriferous quartz, while Mindanao itself is the center of a considerable trade in alluvial gold. From specimens brought from that island the occurrence of rich quartz veins can not be a matter of mere conjecture. Mindanao, though the first discovered island of the group, is the least known and least settled of all. Many points, especially on the south coast, are still held by Malay sultans and rajahs, who, while acknowledging the suzerainty of Spain, have not the power nor the inclination to keep their lieges from their traditional piracies. It is from some of these Malay strongholds that the prahus of the Orang Laut (man of the sea) sally forth on plundering cruises. * * * This iniquitous trade has been stopped on the coasts of Sumatra and Borneo, and it will soon be stopped in Mindanao, where the Spanish Government is now taking drastic repressive measures.

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Mining by modern methods, will, in the course of time, make curios of native mining implements, at least wherever the engineer can take his machinery without breaking the back of the capitalist. * * * In respect of mines by the seashore, the Philippines are unrivaled. Even now a narrow peninsula jutting out into the broad Pacific, a headland of white, glittering quartz is being prepared for the reception of a crushing plant with its appurtenances, and the machinery will be landed almost alongside of the mill site. The peninsula is a vast ore deposit, and, if experienced men are not utterly mistaken, it will soon take a front place among notable mines.

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RUSSIA.

The gold product of Russia in 1897 is officially reported at 34,977 kilograms, fine, of the value of $23,245,714.

The silver yield was 8,856 kilograms, of the coining value of $368,055.

PRODUCTION OF GOLD IN RUSSIA.

[From the Bulletin Russe de Statistique, etc., Nos. 1-3, January to March, 1898.]

Notwithstanding all its efforts, the Bulletin Russe has not yet succeeded in making the exact meaning of the words "production of gold in Russia" understood by those who should be competent in the matter of these statistics of the precious metals. It therefore returns to the subject.

These statistics, published in foreign countries, on the production of gold in Russia sometimes show very serious differences. And yet they are taken from the same sources. Their contradictions proceed from the fact that dissimilar quantities are

added together—gold dust (schlich-gold) to bars; kilograms of base bars to bars expressed in kilograms of gold chemically pure; arrivals with shipments of gold, etc.

In order to avoid this confusion it is necessary to attach very precise meanings to the words one uses.

A. *Production.*—Quantities obtained on the spot by washing or by pulverizing gold dust; wash gold (having the appearance of small, blackish crystals), of unknown fineness, and the yield of which in fine gold approximates to 0.900 (or more exactly, to §).

Alluvial or wash gold always contains a notable proportion of silver.

B. *Statements of the refineries.*—(1) Quantities melted. The gross weight of the bars (whose average fineness fluctuates about the figure 0.910).

(2) Quantities of gold, chemically pure, contained in these bars (saving ulterior verifications at the St. Petersburg Mint).

In the total of these statements the quantities of gold contained in the bars of domestic production (the product of Russian silver and argentiferous lead mines) are included.

C. Arrivals at the mint of St. Petersburg (where all the gold produced in the empire is finally deposited).

D. Outgoings from the mint.

A. PRODUCTION, PROPERLY SO CALLED.

Quantities of gold obtained by washings (placer gold), and by crushing (lode gold).—These quantities, inscribed day after day, without correction, alteration, or erasure, in the registers of the workings (at the very places of production), can not be expressed in fine gold, for the very simple reason that the results of the assay can be known only after the melting into bars at the Governmental refineries of the gold dust shipped by the producers and that this or that lot of bars may contain dust gathered during different calendar years.

There are hundreds of workings in Russia, scattered over an immense area, whose annual production reaches scarcely a few hectograms. It is clear that the proprietors of these small workings do not carry their gold to one of the three Russian refineries (there are only three), as market gardeners carry their asparagus to the market.

As a rule, the average fineness of this dust approximates to 0.900, or, more exactly, to § (0.888+), with very notable differences between one sample and another. It is, therefore, utterly impossible to know exactly how much fine gold Russia produced from the 1st of January to the 31st of December of any given year.

The production, properly so called, may be expressed only: (*a*) to within a gram, only in gold of a hypothetical degree of fineness; (*b*) in fine gold, to only a hypothetical total.

We here give for the seven years, 1890–1896, the weight, within a gram, of the gold dust produced in all points of the empire, including Finland:

Gold dust of an unknown degree of fineness:

Years.	Poods.	Pounds.	Zolotniks.	Dolye.	Kilograms.
1890	2,403	25	2	42	39,372.579
1891	2,386	10	40	74	39,088.133
1892	2,625	4	84	34	43,000.799
1893	2,739	7	47	94	44,869.249
1894	2,621	23	25	95	42,942.810
1895	2,509	29	26	6	41,110.651
1896 *a*	2,269	20	.....	.....	37,175.585
Total	17,555	.....	35	57	287,559.756

a An approximative figure. For the years 1890-1895 the figures are exact to within a gram.

To anyone who wishes to understand the movement of the production of gold in Russia, these are the only figures to be taken by him into consideration. All other figures—the statements of the refineries, the deposits at the mint, and the outgoings from the mint—doubtless depend on the total production; but they do not show with sufficient sensibility its progress, its stationary or retrograde condition.

If one absolutely desired to form an idea of the amount of the production, properly so called, expressed in gold 1,000 fine, one might admit as approximating to the truth the following valuation:

Years.	Valuation in fine gold of the production, assuming an average fineness of 0.900 (a)=9/10.	
	Gold 1,000 fine.	
	Kilograms.	*Kilograms.*
1890	35,435.321	34,997.848
1891	35,179.319	34,745.007
1892	38,700.719	38,222.932
1893	40,382.324	39,883.776
1894	38,648.529	38,171.386
1895	36,999.585	36,542.800
1896	33,457.981	33,044.920
Total	258,803.778	255,608.669

a The reader will find this fineness indicated in several places in the January-March 1898, number of the Bulletin Russe. He is requested to substitute for it everywhere the fineness of eight-ninths. Gold is a thing too precious not to be weighed in balances of precision.

B. GOLD CHEMICALLY PURE (1,000 FINE).

Statements of the refineries during the last fourteen years.—Expressed in fine gold (1,000 fine), the quantities of domestic gold dust melted in the refineries of the Empire during the period 1883–1896 represent the following totals:

Years.	Poods.	Pounds.	Zolotniks.	Dolye.	Kilograms.
1883	1,848	4	4	52	30,272.815
1884	1,878	30	80	59	30,775.200
1885	1,717	31	57	43	28,138.251
1886	1,719	37	18	88	28,173.303
1887	1,897	34	52	5	31,087.946
1888	1,922	21	12	75	31,491.967
1889	2,022	23	40	31	33,130.955
1890	2,155	26	62	75	35,310.883
1891	2,124	20	32	66	34,800.502
1892	2,317	27	.....	75	37,964.669
1893	2,422	25	49	87	39,684.010
1894	2,312	36	37	32	37,886.608
1895	2,223	.....	75	68	36,414.165
1896	1,975	15	.....	.....	32,357.622
Total	28,539	14	45	84	467,488.896

Annual average: Of the period 1883-1896, 33,392.06 kilograms; of the period 1887-1896, 35,012.933 kilograms. Average value: Of the years 1887-1896, 120,600,103 francs. Total of the seven years, 1883-1889, 213,070.436 kilograms; of the seven years, 1890-1896, 254,418.460 kilograms. (The kilogram of fine gold is calculated at 3,444⅔ francs.)

These totals include the quantities of gold contained in the bars of silver coming from the melts in the Russian refineries of domestic silver ores and argentiferous lead.

COMPARISON OF THE FIGURES A (AT EIGHT-NINTHS) AND B.

Let us now set opposite each other, for the seven years 1890-1896, the statements of the refineries expressed in gold 1,000 fine, and those of the valuations above given of the production expressed in gold 1,000 fine, which come nearest to the figures of these statements:

Years.	Kilograms of fine gold.	
	Production.	Statements.
1890	34,997.848	35,310.883
1891	34,745.007	34,800.502
1892	38,222.932	37,964.669
1893	39,883.776	39,684.010
1894	38,171.386	37,886.608
1895	35,542.800	36,414.165
1896	33,044.920	32,357.622
Total	254,608.669	254,418.459

The figures for 1890, 34,997.848 and 35,310.883, represent a difference of 313.035 kilograms, while those of 1896, 33,044.920 and 32,357.622, differ by 687.298 kilograms. When one has to do with a commodity worth 3,437 francs (plus generally a small premium) per kilogram it is easy to see that a quantity greater than 1,000 kilograms (313.035 + 687.298) are no trifle, and that a confusion of the figures A and B presents some inconveniences.

C. DEPOSITS AT THE MINT.

All the gold produced in the Empire, Finland excepted (the production of Finland fluctuates between 4 and 5 kilograms per annum), goes through the refineries of Ekaterinburg, of Tomsk, and of Irkoutsk, in which the statements above given are prepared, after which; when each refinery possesses a sufficient stock (10,000,000 francs at least, which requires a certain time to accumulate), it sends it to the mint at St. Petersburg, the only one in Russia. At the present day the journey from Ekaterinburg or from Tomsk is not very long (everything is relative; from Tomsk to St. Petersburg the journey is still longer than from St. Petersburg to Gibraltar, only there is no custom-house on the line), but it must not be forgotten that the Trans-Siberian railway dates only from yesterday. However, the packing, transportation, unpacking, verification, entering on the registers, etc., requires such considerable time that concordance is impossible for any given calendar year between the statements of the refineries and those of the mint.

COMPARISON OF THE FIGURES A (AT EIGHT-NINTHS), B, AND C.

Years.	Gold of domestic production (kilograms of fine gold).		
	Production.	Statements of the refineries.	Deposits at the mint.
1890	34,997.848	35,310.883	31,841.290
1891	34.745.007	34,800.502	36,348.725
1892	38,222.932	37,964.669	35,602.218
1893	39,883.776	39,684.010	38,382.021
1894	38.171.386	37,886.608	36,312.791
1895	36,542.800	36,414.165	43,478.329
1896	33,044.920	32,357.622	32,404.618
Total	255,608.669	254,418.459	254,369.992

Here for one and the same year (1895) the difference exceeds 7,000 kilograms, or a value of nearly 22,000,000 of francs.

D. OUTGOINGS FROM THE MINT.

We shall say nothing of the outgoings from the mint. On their deposit at the mint the bars of domestic production should be, and, in fact are, distinguished from unparted bars. When they leave the mint it is of no interest to know the respective share of Russian and foreign gold in the total put in circulation or sent to the bank under the form of imperials, half imperials, and 5-rouble pieces.

ADVICE TO STATISTICIANS

There are, as you know, two ways of drawing from the sources of statistics. The first, that of the Bulletin Russe, consists in plunging like a diver into the official publications, in looking there for the figures one has need of, in examining whether these figures agree or conflict, in discovering the reason of the real or apparent contradictions which have been observed in correcting the typographical errors, which are always numerous, and, lastly, in classifying the figures in systematic order. The second way is much the more simple one of forming statistics. It is also, doubtless, much superior to the first, for the majority of statisticians end by adopting it when they had not adopted it from the beginning. This second way requires only a little industry and much letter paper. One wishes to know, for instance, how many pupils in Russia were receiving secondary instruction on the 1st of January, 1897 (that example is imagined by way of trial), a letter is hastily written to the Russian ministry of public instruction asking him for a statement of the number of scholars present in these establishments of secondary instruction. After the answer has been received, word is hastily sent to the printing office telling how the table is to be constructed, and a mistake is made of 25, 30, or 40 per cent (one-third, more or less, of the pupils receiving secondary instruction in Russia come under the jurisdiction of the ministers of war, of the navy, etc.). The information thus given to the public is incomplete, but if one addresses himself year after year to the same department for a continuation of the statistics in question, there is no risk of writing improbable things, and one ends by becoming an authority (in foreign countries) on questions relating to public instruction in Russia.

Only when one is making statistics by correspondence one must guard against addressing himself now to Peter and now to Paul. One would thus witness the

number of young pupils increase from one year to another in inconceivable proportions, or dimish in such a way as to lead to the belief that a terrible epidemic had ravaged the country.

In like manner if one wishes to be informed on the production of gold in Russia, and if one is lacking in the leisure or the necessary ideas to study the subject himself, it is necessary for him to avoid placing under contribution different departments. For D, whom you questioned last year, the gold is really produced only at the moment when it leaves the mint transformed into commercial bars, into coins, or medals. For A, on the other hand, who is a mining engineer, the gold is produced just as soon as it is washed. For C, who assists at the reception of the caravans, the production of the gold coincides with the entry of the bars in a register kept for that purpose. It is perfectly permissible to place oneself at any one of these three points of view, and even at each of them, successively, but one must know at which point of view he has placed himself in indicating this or that figure, and it frequently happens that the statisticians devoted to method No. 2 are absolutely ignorant as to the point of view at which they have been placed. This leads them, when they have successively interrogated Peter, Paul, and James, to add together with a ready pen the most hetroclite data and to wonder that the Bulletin Russe, "although the source of the information" contains totals different from their own, "which are official."

Desirous of sparing hurried statisticians new surprises, we supply them below, with the list of the questions they should ask when they wish to learn the production of gold in Russia in any given year and the name of the department to which their questions should be sent, in order that the answers received may be authoritative in the matter.

A. Minister of agriculture and domains, direction (department) of mines, at St. Petersburg: Quantities of gold dust of unknown fineness (about eight-ninths) (slich gold) produced from the 1st of January to the 31st of December, 18—, including all the workings not coming within the jurisdiction of the ministry of domains. This last point should be especially specific.

B. Same ministry, same direction (in Russian department), same address: Quantities of gold, 1,000 fine (chemically pure), contained in the bars melted from January 1 to December 31, 18—, by the refineries at Ekaterinburg, Thomsk, and Irkutsk. It is necessary to specify expressly that the question bearing on the absolute integrality of the bars, whatever their nature, source, or destination.

C. Ministry of finances, chancellery of the operations of credit, second section: Quantities of gold, 1,000 fine, received from the Russian refineries by the mint from January 1 to December 31, 18—.

D. Same ministry, same chancellery, same section: Quantities of gold, 1,000 fine, contained in the bars, coins, medals, etc., issued from the mint from January 1 to December 31, 18—.

Do not give A the questions asked of C, and vice versa. Do not mix the answers; verify the additions (the official statistics); do not exert yourself to make their totals agree with the elements which they contain. Verify all the columns of millions, hundreds of thousands, etc. The column of units is nearly always correct.—G. B. V.

GOLD PRODUCTION: FIRST, IN DUST; SECOND, IN FINE GOLD; STATEMENTS OF THE REFINERIES AND DEPOSITED AT THE MINT (FINE GOLD).

[Authentic figures, exempt from error.]

Years.	A. Production stated in the registers of the workings and expenses in—					B. Statements of the refineries, including the gold contained in silver.				C. Deposits at the mint.			
	1. Gold dust containing about eight-ninths of fine gold.				2. Gold chemically pure (1,000 fine). a	Gold chemically pure (1,000 fine).							
	Poods.	*Lbs.*	*Zolot.*	*Dolye.*		*Poods.*	*Lbs.*	*Zolot.*	*Dolye.*	*Poods.*	*Lbs.*	*Zolot.*	*Dolye.*
1870	2,156	23	16	16	.....	.....				1,957	5	84	79
1871	2,399	37	78	8	.....	.....				2,187	37	32	54
1872	2,330	30	88	58	.....	.....				2,127	39	7	84
1873	2,024	29	30	79	.....	.....				2,090	32	72	90
1874	2,027	4	45	70	.....	.....				1,799	30	5	82
1875	1,995	29	44	37	.....	.....				1,889	32	24	73
1876	2,054	3	68	36	.....	.....				2,602	36	38	58
1877	2,515	8	16	22	.....	.....				2,249	30	29	33
1878	2,572	4	33	76	.....	.....				2,329	2	27	47
1879	2,631	29	53	82	.....	.....				2,319	36	17	36
10 years	22,708	0	87	4	.....	.....				21,555	2	53	60
1880	2,641	28	82	91½	.....	.....				2,355	30	38	19
1881	2,244	5	36	22	.....	.....				1,052	33	41	81
1882	2,207	10	15	94¾	.....	.....				1,239	9	13	16
1883	2,182	14	49	95	.....	1,848	4	4	52	1,796	5	34	61
1884	2,178	17	85	2	.....	1,878	30	80	59	2,350	13	53	10
1885	2,015	22	63	88½	.....	1,717	31	57	43	2,260	39	93	58
1886	2,042	4	9	58	.....	1,719	37	18	88	1,884	28	48	48
1887	2,128	2	21	62½	.....	1,897	34	52	5	1,845	26	55	77
1888	2,146	27	2	51	.....	1,922	21	12	75	1,956	30	87	83
1889	2,274	19	72	0	.....	2,022	23	40	31	2,128	27	23	54
10 years	22,060	32	55	85¼	.....	.....				18,871	5	10	27
1890	2,403	25	2	42	.....	2,155	26	62	75	1,943	34	15	9
1891	2,386	10	40	74	.....	2,124	20	32	66	2,219	0	95	3
1892	2,625	4	84	34	.....	2,317	27	0	75	2,173	18	6	63
1893	2,739	7	47	94	.....	2,422	25	49	87	2,343	6	14	47
1894	2,621	23	25	95	.....	2,312	36	37	32	2,216	33	23	10
1895	2,509	29	26	6	.....	2,223	0	75	68	2,654	10	93	4
1896	2,269	20	0	0	.....	1,975	15	0	0	1,978	9	73	2
7 years	17,555	0	35	57	.....	15,531	31	67	19	15,528	33	32	42
Total	62,323	33	82	50¼	.....	.....				55,955	1	0	33

a See the corrresponding column of the table following, in which all the figures of the present table are converted into kilograms and grams.

1 pood = 40 Russian pounds = 3.840 zolotniks = 368.640 dolye. 1 pound = 96 zolotniks = 9.216 dolye. 1 pood = 16.380496. 1 zolotnik = 96 dolye.

The reader will notice the extreme regularity of the production. When the fiscal system has not been modified (see note to the next table) the variations from year to year rarely reach 10 per cent.

A.—PRODUCTION EXPRESSED, FIRST, IN DUST (ABOUT EIGHT-NINTHS FINE); SECOND, IN GOLD (1,000 FINE) B. STATEMENTS OF THE REFINERIES (FINE GOLD), AND C. DEPOSITS OF DOMESTIC GOLD (EXPRESSED IN FINE GOLD) AT THE MINT OF ST. PETERSBURG.

Years.	A.—Production stated on the spot and expense in—		B.—Statements of refineries, inclusive of gold contained in silver ore. *a*	C.—Deposits at the mint (domestic gold).
	Schlich gold (⅞ fine).	Fine gold (1,000 fine).	Gold, chemically pure (1,000 fine).	
	Kilograms.	*Kilograms.*	*Kilograms.*	*Kilograms.*
1870	35,325.837	31,400.744	.....	32,059.039
1871	39,312.295	34,944.262	.....	35,839.436
1872	38,179.219	33,937.084	.....	34,857.320
1873	33,166.131	29,481.005	.....	34,248.652
1874	33,205.098	29,515.643	.....	29,480.821
1875	32,691.155	29,058.805	.....	30,955.966
1876	33,647.037	29,908.477	.....	42,636.957
1877	*b* 41,200.293	*b* 36,622.470	.....	36,852.145
1878	42,132.418	37,451.038	.....	38,151.111
1879	43,109.190	38,319.280	.....	38,001.186
10 years	371,968.673	330,638.808	.....	358,062.633
1880	43,272.710	38,464.631	.....	38,588.516
1881	*b* 36,760.035	*b* 32,675.587	.....	17,245.975
1882	36,155.917	32,138.593	.....	20,299.176
1883	35,748.188	31,776.167	30,272.815	29,421.567
1884	35,684.044	31,719.150	30,775.200	38,499.716
1885	33,015.981	29,347.539	28,138.251	37,036.291
1886	33,450.652	29,733.914	28,173.303	30,872.528
1887	34,858.606	30,985.427	31,087.946	30,232.909
1888	35,163.612	31,256.545	31,491.967	32,052.909
1889	37,257.336	33,117.632	33,130.955	34,868.853
10 years	361,367.081	321,215.185	.....	309,118.431
1890	39,372.579	34,997.848	35,310.883	31,841.290
1891	39,088.133	34,745.007	34,800.502	36,348.725
1892	43,000.790	38,222.932	37,964.669	35,602.218
1893	44,869 249	39,883.776	39,684.010	38,383.021
1894	42,942.810	38,171.386	37,886.608	36,312.791
1895	41,110.651	36,542.800	36,414.165	43,478.329
1896	37,175.535	33,044.920	32,357.622	32,404.618
7 years	287,559.747	255,608.669	254,418.459	254,369.992
General total	1,020,895.501	907,462.662	.....	.....

a Notwithstanding all our research, we have not been able to find the figures of the period 1870–1882.

b A decree rendered in the committee of the ministers of November 10, 1876, had abolished the duties collected in favor of the State on gold; hence the abrupt increase of the production. When the duties were restored, the production decreased no less rapidly and almost to the same extent.

PRODUCTION OF SILVER IN RUSSIA.

1. Silver Obtained from the Treatment of Silver Ores and Argentiferous Lead Ores.

Five-year periods.	Quantities of silver of unknown fineness (about $\frac{9}{10}$) expressed in—	
	Russian poods and pounds.	Kilograms.
1822–1825	4,540	74,367.452
1826–1830	5,780	94,679.267
1831–1835	6,361.8	104,199.611
1836–1840	6,053.6	99,153.599
1841–1845	5,980.33	97,968.880
1846–1850	5,690.32	93,218.127
1851–1855	5,236.33	85,781.791
1856–1860	5,306.2	86,915.731
1861–1865	5,259.31	86,157.723
1866–1870	4,972.17½	81,451.095
1871–1875	3,509	57,479.160
1876–1880	3,378.2	55,334.135
1881–1885	2,731.1	44,735.544
1886–1890	4,408.30½	72.217.613
69 years	69,207.36	1,133,659.728

Expressed in silver (1,000 fine) the above quantities correspond to a total of 63,000 poods = 1,032,000 kilograms, or an annual average of less than 15,000 kilograms.

2. SILVER CONTAINED IN THE BARS OBTAINED BY MELTING GOLD DUST.

The gold dust contains nearly one-eleventh of fine silver. The production of gold dust during the years 1822–1890 having been about 97,000 poods, we may assume for this period a total of 8,800 poods (144,000 kilograms) of silver (1,000 fine) obtained from the refining of gold.

The grand total of the years 1822–1890 must have approximated 1,200,000 kilograms of fine silver. This is about one-fourth of the world's production of silver in one year at the present time.

Domestic Silver—Silver Obtained from Silver Ore and Argentiferous Lead Ore—Silver Contained in Domestic Gold—Statements of the Refineries.

Years.	Silver chemically pure obtained from—				Total kilograms.
	Silver ores and argentiferous lead ores.		The refining of gold.		
	Poods and pounds.	Kilograms.	Poods and pounds.	Kilograms.	
1883	411.39	6,748.354	179.31	2,944.803	9,693.157
1884	527.23	8,641.940	229.10	3,755.228	12,397.168
1885	537.8	8,799.602	146.9	2,395.238	11,194.840
1886	762.24	12,491.760	151.7½	2,476.526	14,968.286
1887	876.31½	14,362.215	166.7½	2,722.234	17,084.449
1888	823.22	13,490.157	171.00	2,801.064	16,291.221

DOMESTIC SILVER—SILVER OBTAINED FROM SILVER ORE AND ARGENTIFEROUS LEAD ORE—SILVER CONTAINED IN DOMESTIC GOLD—STATEMENTS OF THE REFINERIES—Continued.

Years.	Silver chemically pure obtained from—				Total kilograms.
	Silver ores and argentiferous lead ores.		The refining of gold.		
	Poods and pounds.	Kilograms.	Poods and pounds.	Kilograms	
1889	773.00	12,662.123	179.8	2,935.384	15,597.507
1890	826.13	13,535.614	185.25¾	3,040.936	16,576.550
Total	5,539.0½	90,731.765	1,408.18¾	23,071.413	113,803.178
1891	(?)	(?)	(?)	(?)	(?)
1892	627.2¾	10,271.697	208.22¾	3,416.459	13,688.156
1893	538.2	8,813.526	222.21¾	3,645.377	12,458.903
1894	398.28¾	6,432.927	216.22½	3,547.401	9,980.328
1895	441.8	7,227.074	215.19½	3,529.790	10,756.864
Total of the four last years	1,999.1½	32,745.224	863.6½	14,139.027	46,884.251

The Altai region alone supplies more than two-thirds of the above quantities. Silver has been worked since 1745.

One hundred and thirty years ago Russia reached its maximum, nearly 30,000 kilograms (4 or 5 per cent of the world's production at that time). At present Russia furnishes scarcely more than one-fourth or one-fifth of the world's production.

THE PRODUCTION OF GOLD IN RUSSIA DURING THE THIRTEEN FIVE-YEAR PERIODS 1816–1880, AND DURING THE SIXTEEN YEARS 1881–1896.

[The quantities below are expressed up to 1860 in bars and of average fineness of about eleven-twelfths, and beginning with 1861 in gold dust (schlich gold) of the fineness of about eight-ninths] *a*

Five-year periods.	Eleven-twelfths fine.	Russian equivalent.	
	Kilograms.	*Poods.*	*Lbs.*
1816–1820	1,383.845	84	19½
1821–1825	10,326.674	630	17
1826–1830	24,181.810	1,476	10½
1831–1835	33,297.453	2,032	30
1836–1840	37,602.247	2,295	22
1841–1845	88,193.000	5,384	1
1846–1850	132,591.515	8,094	19
1851–1855	123,676.840	7,550	10
1856–1860	133,172.511	8,129	37¾
Total	584,425.896	35,678	6½
Gold 1,000 fine	535,724.000	32,705	
Annual average expressed in gold 1,000 fine	11,905.000	727	

a The figures of the two five-year periods 1861–1865 and 1866–1870 are approximative (to about 1 Russian pound); those of the years 1871–1875 are exact to nearly 1 gram; those of 1876 may diverge from the reality by 4 or 5 kilograms.

Annual value of the production at 3,444.44 francs per kilogram fine, 41,006,058 francs.

THE PRODUCTION OF GOLD IN RUSSIA DURING THE THIRTEEN FIVE-YEAR PERIODS 1816-1880, AND DURING THE SIXTEEN YEARS 1881-1896—Continued.

Five-year periods and years.	Eight-ninths fine.	Russian equivalent.			
	Kilograms.	*Poods.*	*Pounds.*	*Zolot.*	*Dolye.*
1861-1865	120,403.710	7,350	17	24	0
1866-1870	150,896.720	9,211	39	0	0
1871-1875	176,553.896	10,778	11	95	60
1876-1880 *a*	203,361.647	12,414	34	58	19
1881	36,760.035	2,244	5	36	22
1882	36,155.917	2,207	10	15	95
1883	35,748.188	2,182	14	49	95
1884	35,684.044	2,178	17	85	2
1885	33,015.981	2,015	22	63	88
1886	33,450.652	2,042	4	9	58
1887	34,858.606	2,128	2	21	62
1888	35,163.612	2,146	27	2	51
1889	37,257.336	2,274	19	72	0
1890	39,372.579	2,403	25	2	42
1891	39,088.133	2,386	10	40	74
1892	43,000.799	2,625	4	84	34
1893	44,869.249	2,739	7	47	94
1894	42,942.810	2,621	23	25	95
1895	41,110.651	2,509	29	26	6
1896	37,175.535	2,269	20	0	0
Total	1,256,870.100	76,729½			
Gold at 1,000 fine	1,117,218 000	68,204			
Annual average in gold 1,000 fine	31,034.000	1,894½			

a The figures of the two five-year periods 1871-1875 and 1876-1880 differ by about 550 kilograms from those of an official statement of the Department of Mines (made for the Chicago Exposition, 1893). We, however, have reason to consider them exactly correct.

Annual value of the production at 3,444.44 francs per kilogram fine, 106,894.889 francs.

A GIANT GOLD NUGGET.

Under date of March 9, 1898, Consul Smith, of Moscow, says that a telegram from Tomsk announces the finding of a gold nugget weighing 70 pounds in the Spasso Preobrajensk mines, situated on the River Chibyek, in the district of Yeansay. The nugget, says the consul, will be found to take the eleventh place, as far as size is concerned, among the nuggets of the whole world, and the second among those found in Russia. The first was found in the South Ural Mountains. (From Consular Reports for May, 1898, p. 153.)

SPAIN.

No official information on the silver output of Spain in 1896 or 1897 has been received by this Bureau. According to the Statistique Minérale de la France, it amounted to 179,795 kilograms fine, of the coining value of $7,472,300 in 1896, and in the absence of data for 1897 is assumed to have been the same in the latter as in the former year.

SWEDEN.

Sweden produced, in 1897, gold weighing 127 kilograms, of the value of $84,404; and silver weighing 645 kilograms, of the coining value of $26,806.

TURKEY.

The last official returns of the production of gold and silver in Turkey received by this Bureau were for the year 1894.

According to data received by the director of the French mint, its production of gold in 1895 was 8 kilograms, and of silver 10,208 kilograms, of the commercial value of 884,415 francs, representing 8,120 kilograms fine, of the coining value of $337,451.

According to the Statistique de l'Industrie en France et en Algerie, Turkey's production of gold in 1896 was 11 kilograms fine, of the value of $7,311, and its silver product 7,007 kilograms fine, of the coining value of $291,211. The gold and silver output of Turkey in 1897 is assumed to have been the same as in 1896.

URUGUAY.

The value of the gold extracted from quartz in Uruguay in 1897 was $38,506, representing 58 kilograms fine, and for 1896 $33,606, representing 50.5 kilograms fine.

VENEZUELA.

According to a report to the British foreign office of acting consul at Caracas, Mr. W. A. Andral, the exports of gold bullion from that seaport in 1897 was £128,906, or $627,321, representing 944 kilograms. This figure, however, is scarcely sufficient to base an estimate of its gold production, and it is therefore assumed to have been the same as in 1896.

THE YUKON.

For the production of this district see Canada and Alaska.

PART III.

GENERAL STATISTICS.

I.—DEPOSITS AND PURCHASES OF GOLD AND SILVER, BY WEIGHT,

Description of deposits.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Domestic bullion, unrefined	6,884.060	170,203.492	33,255.064	379.082
Domestic bullion, refinery bars	592.515	.....	.....	.....
Domestic bullion, refined	53,247.839	1,058,110.612	.....	.....
Total domestic bullion	60,724.414	1,228,374.104	33,255.064	379.082
Domestic coin, Treasury transfers	19,186.460	.....	.....	.....
Domestic coin, mutilated and abraded	4,337.353	332.810	.....	513.980
Foreign bullion, unrefined	4,706.307	44,514.701	.....	11,176.132
Foreign bullion, refined	.....	48,647.276	.....	.....
Foreign coin	149.908	532,602.286	6.709	1,608.430
Jewelers' bars, old plate, etc	38,110.694	2,053.675	14.995	4,380.483
Total deposits	127,215.136	1,856,524.852	33,276.769	18,058.157
Redeposits:				
Fine bars	1,023,546.227	23,971.172	.....	.....
Mint bars	319,609.432	.....	.....	.....
Unparted bars	573,353.335	.....	.....	.....
Total redeposits	1,916,508.994	23,971.172	.....	.....
Total gold operated on	2,043,724.130	1,880,496.024	33,276.769	18,058.157
SILVER.				
Domestic bullion, unrefined	3,398.36	32,465.54	230,887.11	88.26
Domestic bullion, refinery bars	.....	.....	.....	.....
Domestic bullion, refined	.....	.....	.....	.....
Total domestic bullion	3,398.36	32,465.54	230,887.11	88.26
Domestic coin, Treasury transfers	3,535,465.08	411,524.02	.....	510,911.20
Domestic coin, mutilated and uncurrent	2,729.37	365.10	.....	864.18
Trade dollars	275.32	.....	.....	.87
Foreign bullion, unrefined	327.14	23,960.16	.....	2,040.71
Foreign bullion, refined	.....	.....	.....	.....
Foreign coin	.....	.....	.35	5.20
Jewelers' bars, old plate, etc	72,169.28	705.40	30.64	5,374.46
Total deposits	3,614,364.55	468,920.22	230,918.10	519,284.88
Redeposits:				
Fine bars	97,022.65	.....	.....	.....
Unparted bars	107,122.74	.....	.....	.....
Total redeposits	204,145.39	.....	.....	.....
Total silver operated on	3,818,509.94	468,920.22	230,918.10	519,284.88

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
341, 148. 783	140, 862. 202	61, 947. 020	104, 195. 395	10, 436. 104	743. 435	870, 114. 637
423, 895. 436	233, 981. 403	.....	.....	2, 852. 908	1, 456. 305	662, 778. 567
533, 959. 712	277, 835. 210	.....	483. 407	.....	214. 834	1, 923, 851. 614
1, 299, 008. 931	652, 678. 815	61, 947. 020	104, 678. 802	13, 289. 012	2, 414. 574	3, 456, 744. 818
.....	.....	.....	.....	.....	.....	19, 186. 460
15, 476. 531	6. 090	.....	.....	.....	106. 893	20, 773. 657
124, 785. 171	282. 196	.....	17, 298. 561	.....	40. 846	202, 803. 914
35, 511. 678	.....	.....	.....	.....	.....	84, 158. 954
253, 609. 220	86. 450	.....	.....	6. 145	.....	788, 069. 198
105, 015. 885	1, 728. 592	.....	140. 077	120. 848	2, 625. 242	154, 190. 492
1, 833, 402. 416	654, 782. 143	61, 947. 020	122, 117. 440	13, 416. 005	5, 187. 555	4, 725, 927. 493
83. 021	13. 715	.....	.....	.....	37. 104	1, 047, 651. 239
.....	.....	.....	.....	.....	.....	319, 609. 432
70. 250	554. 556	13, 050. 067	282. 422	.....	.....	587, 310. 630
153. 271	568. 271	13, 050. 067	282. 422	.....	37 104	1, 954, 571. 301
1, 833, 555. 687	655, 350. 414	74, 997. 087	122, 399. 862	13. 416. 005	5. 224. 659	6, 680, 498. 794
270, 009. 03	46, 964. 43	14, 705. 42	27, 791. 10	1, 157. 77	213. 56	627, 680. 58
130, 203. 02	10, 192. 24	.....	.....	1. 85	24. 57	140, 421. 68
4, 417, 402. 99	.....	.....	.....	.....	.....	4, 417, 402. 99
4, 817, 615. 04	57, 156. 67	14, 705. 42	27, 791. 10	1, 159. 62	238. 13	5, 185, 505. 25
.....	.....	.....	.....	.....	.....	4, 457, 900. 30
.....	.....	.....	.....	.....	.....	3, 958. 65
.....	.....	.....	.....	.....	.....	276. 19
607, 099. 00	138. 01	.....	5, 041. 86	.....	7. 10	638, 513. 98
.....	.....	.....	.....	.....	.....	.....
100, 197. 55	.....	.....	.....	.....	.....	100, 203. 10
454, 012. 48	540. 97	.....	40. 79	61. 23	895. 49	533, 830. 74
5, 978, 924. 07	57, 835. 65	14, 705. 42	32, 873. 75	1, 220 85	1, 140. 72	10, 920, 188. 21
24, 043. 15	.....	.....	.....	.....	.....	121, 065. 80
495. 67	409. 73	2, 693. 21	131. 48	.....	.....	110, 852. 83
24, 538. 82	409. 73	2, 693. 21	131. 48	.....	.....	231, 918. 63
6, 003, 462. 89	58, 245. 38	17, 398. 63	33, 005. 23	1, 220. 85	1, 140. 72	11, 152, 106. 84

II.—Deposits and Purchases of Gold and Silver, by Value,

Description of deposits.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.				
Domestic bullion, unrefined	$128, 075. 54	$3, 167, 692. 87	$618, 698. 87	$7, 052. 69
Domestic bullion, refinery bars	11, 023. 53			
Domestic bullion, refined	990, 657. 47	19, 685, 778. 83		
Total domestic bullion	1, 129, 756. 54	22, 853, 471. 70	618, 698. 87	7, 052. 69
Domestic coin, Treasury transfers	356, 957. 40			
Domestic coin, mutilated and abraded	80, 694. 94	6, 191. 81		9, 562. 42
Foreign bullion, unrefined	87, 559. 20	828, 180. 48		207, 928. 04
Foreign bullion, refined		905, 065. 60		
Foreign coin	2, 788. 99	9, 908, 879. 74	124. 82	29, 925. 20
Jewelers' bars, old plate, etc	709, 036. 15	38, 207. 91	279. 00	81, 497. 36
Total deposits	2, 366, 793. 22	34, 539, 997. 24	619, 102. 69	335, 965. 71
Redeposits:				
Fine bars	19, 042, 720. 51	445, 975. 29		
Mint bars	5, 946, 221. 99			
Unparted bars	10, 667, 038. 79			
Total redeposits	35, 655, 981. 29	445, 975. 29		
Total gold operated on	38, 022, 774. 51	34, 985, 972. 53	619, 102. 69	335, 965. 71
SILVER.				
Domestic bullion, unrefined	3, 954. 45	37, 778. 08	268, 668. 63	102. 70
Domestic bullion, refinery bars				
Domestic bullion, refined				
Total domestic bullion	3, 954. 45	37, 778. 08	268, 668. 63	102. 70
Domestic coin, Treasury transfers	4, 113, 995. 72	478, 864. 32		594, 514. 85
Domestic coin, mutilated and uncurrent	3, 176. 00	424. 84		1, 005. 59
Trade dollars	320. 37			1. 01
Foreign bullion, unrefined	380. 67	27, 764. 55		2, 374. 64
Foreign bullion, refined				
Foreign coin			. .41	6. 05
Jewelers bars, old plate, etc	83, 978. 79	820. 83	35. 65	6, 253. 92
Total deposits	4, 205, 806. 00	545, 652. 62	268, 704. 69	604, 258. 76
Redeposits:				
Fine bars	112, 899. 08			
Unparted bars	124, 651. 92			
Total redeposits	237, 551. 00			
Total silver operated on	4, 443, 357. 00	545, 652. 62	268, 704. 69	604, 258. 76
Total gold	38, 022, 774. 51	34, 985, 972. 53	619, 102. 69	335, 965. 71
Total silver	4, 443, 357. 00	545, 652. 62	268, 704. 69	604, 258. 76
Grand total	42, 466, 131. 51	35, 531, 625. 15	887, 807. 38	940, 224. 47

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
$6, 346, 954. 11	$2, 620, 692. 13	$1, 152, 502. 60	$1, 938, 518. 97	$194, 160. 08	$13, 831. 35	$16, 188, 179. 30
7, 886, 426. 71	4, 353, 142. 38	.....	.....	53, 077. 35	27, 094. 04	12, 330, 764. 01
9, 934, 134. 18	5, 169, 027. 16	.....	8, 993. 62	.....	3, 996. 91	35, 792, 588. 17
24, 167, 515. 00	12, 142, 861. 67	1, 152, 502. 69	1, 947, 512. 59	247, 237. 43	44, 922. 30	64, 311, 531. 48
.....	.....	.....	.....	.....	.....	356, 957. 40
287, 935. 46	113. 31	.....	.....	.....	1, 988. 71	386, 486. 65
2, 321, 584. 57	5, 250. 16	.....	321, 833. 69	.....	759. 93	3, 773. 096. 07
660, 682. 38	.....	.....	.....	.....	.....	1, 565, 747. 98
4, 718, 311. 07	1, 608. 37	.....	.....	114. 32	.....	14, 661, 752. 51
1, 953, 783. 91	32, 159. 85	.....	2, 606. 08	2, 248. 34	48, 841. 71	2, 868, 660. 31
34, 109, 812. 39	12, 181, 993. 36	1, 152, 502. 69	2, 271, 952. 36	249, 600. 09	96, 512. 65	87, 924, 232. 40
1, 544. 57	255. 16	.....	.....	.....	690. 31	19, 491, 185. 84
.....	.....	.....	.....	.....	.....	5, 946. 221. 99
1, 306. 98	10, 317. 32	242, 791. 95	5, 254. 36	.....	.....	10, 926, 709. 40
2, 851. 55	10, 572. 48	242, 791. 95	5, 254. 36	.....	690. 31	36, 364, 117. 23
34, 112, 663. 94	12, 192, 565. 84	1, 395, 294. 64	2, 277, 206. 72	249, 600. 09	97, 202. 96	124, 288, 349. 63
314, 192. 32	54, 649. 52	17, 111. 76	32, 338. 73	1, 347. 22	248. 51	730, 391. 92
151, 508. 97	11, 860. 06	.....	.....	2. 15	28. 59	163, 399. 77
5, 140, 250. 75	.....	.....	.....	.....	.....	5, 140, 250. 75
5, 605, 952. 04	66, 509. 58	17, 111. 76	32, 338. 73	1, 349. 37	277. 10	6, 034, 042. 44
.....	.....	.....	.....	.....	.....	5, 187, 374. 89
.....	.....	.....	.....	.....	.....	4, 606. 43
.....	.....	.....	.....	.....	.....	321. 38
706, 442. 47	160. 59	.....	5, 866. 89	.....	8. 26	742, 998. 07
.....	.....	.....	.....	.....	.....	.....
116, 593. 51	.....	.....	.....	.....	.....	116, 599. 97
528, 305. 43	629. 49	.....	47. 46	71. 25	1, 042. 02	621, 184. 84
6, 957, 293. 45	67, 299. 66	17, 111. 76	38, 253. 08	1, 420. 62	1, 327. 38	12, 707, 128. 02
27, 977. 48	.....	.....	.....	.....	.....	140, 876. 56
576. 78	476. 78	3, 133. 92	153. 00	.....	.....	128, 992. 40
28, 554. 26	476. 78	3, 133 92	153. 00	.....	.....	269, 868. 96
6, 985, 847. 71	67, 776. 44	20, 245. 68	38, 406. 08	1, 420. 62	1, 327. 38	12, 976, 996. 98
34, 112, 663. 94	12, 192, 565. 84	1, 395, 294. 64	2, 277, 206. 72	249, 600. 09	97, 202. 96	124, 288, 349. 63
6, 985, 847. 71	67, 776. 44	20, 245. 68	38, 406. 08	1, 420. 62	1, 327. 38	12, 976, 996. 98
41, 098, 511. 65	12, 260, 342. 28	1, 415, 540. 32	2, 315, 612. 80	251, 020. 71	98, 530. 34	137, 265, 346. 61

III.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES 0.992) OF DOMESTIC BULLION NOT DISTRIBUTED, BY WEIGHT,

	Source.	COINAGE MINTS.			
		Philadelphia.	San Francisco.	Carson.	New Orleans.
		Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
1	Alabama	10.765			226.243
2	Alaska	188.914	5,190.880		
3	Arizona	674.032	20,650.915	1.535	
4	California	53.338	120,743.286	11,250.284	
5	Colorado	455.303	59.572		
6	Georgia	582.409			
7	Idaho	177.800	2,402.271		
8	Iowa	4.445			
9	Maryland	5.277			
10	Michigan	113.784			
11	Minnesota	160.479			
12	Montana	722.317	99.484		
13	Nevada	6.593	2,542.433	22,003.245	
14	New Mexico	10.800	122.684		66.773
15	North Carolina	378.683			
16	Oregon		9,600.497		
17	South Carolina	97.290			
18	South Dakota	1,537.374			
19	Tennessee	5.171			
20	Texas				86.066
21	Utah		5,429.669		
22	Vermont	8.304			
23	Virginia	125.885			
24	Washington	79.564	3,405.784		
25	West Virginia	5.638			
26	Wyoming	75.898			
27	Other sources	1,403.997	16.017		
	Total unrefined	6,884.060	170,263.492	33,255.064	379.082
	Refinery bars (fineness below 0.992)	592.515			
	Refined bullion (fineness 0.992 and over)	53,247.839	1,058,110.612		
	Total domestic	60,724.414	1,228,374.104	33,255.064	379.082

AND TERRITORIES PRODUCING THE SAME, AND OF REFINERY BARS (FINENESS BELOW DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.	
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.		
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	
.....	.....	.....	.....	83.850	75.161	396.019	1
44.355	295.818	.....	.....	.....	.....	5,719.967	2
805.929	4,492.725	.....	.....	.....	7.387	26,632.523	3
96.961	624.815	.....	.....	.....	.....	132,768 684	4
9,496.293	120,204.244	.....	.....	.....	314.221	130,529.633	5
19.778	.....	.....	.....	6,732.152	.....	7,334.339	6
1,132.399	165.369	27,515.774	19,970.154	.....	.....	51,363.767	7
.....	.....	.....	.....	.....	.....	4.445	8
.....	.....	.....	.....	.....	.....	5.277	9
830.167	.....	.....	.....	.....	.....	943.951	10
.....	.....	.....	.....	.....	.....	160.479	11
8,382.611	118.318	3,362.195	77,213.550	.....	.....	89,898.475	12
97,763.363	.....	.....	.....	.....	.....	122,315.634	13
1,457.029	3,725.129	.....	.....	.....	270.891	5,653.306	14
153.150	.....	.....	.....	1,328.215	.....	1,860.048	15
.....	114.438	30,804.021	2,342.352	.....	.....	42,861 308	16
.....	.....	.....	.....	2,291.887	.....	2,389.177	17
219,095.627	8,656.850	.....	.....	.....	61 189	229,351.040	18
.....	.....	.....	.....	.....	.....	5.171	19
.....	.....	.....	.....	.....	.....	86.066	20
1,777.460	1,945.486	217.012	28.368	.....	.....	9,397.995	21
.....	.....	.....	.....	.....	.....	8.304	22
78.718	.....	.....	.....	.....	.....	204.603	23
14.943	.....	48.018	4,634.212	.....	.....	8,182.521	24
.....	.....	.....	.....	.....	.....	5.638	25
.....	519.010	.....	6.759	.....	.....	601.667	26
.....	.....	.....	.....	.....	14.586	1,434 600	27
341,148.783	140,862.202	61,947.020	104,195.395	10,436.104	743.435	870,114.637	
423,895.436	233,981.403	.....	.....	2,852.908	1,456.305	662,778.567	
533,959.712	277,835.210	.....	483.407	.....	214.834	1,923,851.614	
1,299,003.931	652,678.815	61,947.020	104,678.802	13,289.012	2,414.574	3,456,744.818	

IV.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES 0.992) OF DOMESTIC BULLION NOT DISTRIBUTED, BY VALUE,

	Sources.	COINAGE MINTS.			
		Philadelphia.	San Francisco.	Carson.	New Orleans.
1	Alabama	$200.28			$4,209.17
2	Alaska	3,514.68	$96,574.51		
3	Arizona	12,540.13	384,203.07	$28,56	
4	California	992.33	2,246,386.72	209,307.61	
5	Colorado	8,470.75	1,108.32		
6	Georgia	10,835.52			
7	Idaho	3,307.91	44,693.41		
8	Iowa	82.70			
9	Maryland	98.18			
10	Michigan	2,116.91			
11	Minnesota	2,985.66			
12	Montana	13,438.46	1,850.86		
13	Nevada	122.66	47,301.08	409,362.70	
14	New Mexico	200.93	2,282.49		1,242.29
15	North Carolina	7,045.27			
16	Oregon		178,613.90		
17	South Carolina	1,810.04			
18	South Dakota	28,602.31			
19	Tennessee	96.20			
20	Texas				1,601.23
21	Utah		101,017.10		
22	Vermont	154.49			
23	Virginia	2,342.05			
24	Washington	1,480.26	63,363.42		
25	West Virginia	104.89			
26	Wyoming	1,412.06			
27	Other sources	26,120.87	297.99		
	Total unrefined	128,075.54	3,167,692.87	618,698.87	7,052.69
	Refinery bars (fineness below 0.992)	11,023.53			
	Refined bullion (fineness 0.992 and over)	990,657.47	19,685,778.83		
	Total domestic	1,129,756.54	22,853,471.70	618,698.87	7,052.69

AND TERRITORIES PRODUCING THE SAME, AND OF REFINERY BARS (FINENESS BELOW DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.	
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.		
.....	.....	.....	.....	$1,560.00	$1,398.35	$7,367.80	1
$825.21	$5,503.59	.....	.....	.....	.....	106,417.99	2
14,994.03	83,585.58	.....	.....	.....	137.43	495,483.80	3
1,803.93	11,624.47	.....	.....	.....	.....	2,470,115.06	4
176,675.22	2,236,358.03	.....	.....	.....	5,845.97	2,428,458.29	5
367.96	.....	.....	.....	125,249.34	.....	136,452.82	6
21,067.89	3,076.63	$511,921.38	$371,537.74	.....	.....	955,604.96	7
.....	.....	.....	.....	.....	.....	82.70	8
.....	.....	.....	.....	.....	.....	98.18	9
15,444.97	.....	.....	.....	.....	.....	17,561.88	10
.....	.....	.....	.....	.....	.....	2,985.66	11
155,955.55	2,201.26	62,552.46	1,436,531.16	.....	.....	1,672,529.75	12
1,818,853.26	.....	.....	.....	.....	.....	2,275,639.70	13
27,107.53	69,304.73	.....	.....	.....	5,039.83	105,177.80	14
2,849.30	.....	.....	.....	24,710.97	.....	34,605.54	15
.....	2,129.08	573,098.06	43,578.64	.....	.....	797,419.68	16
.....	.....	.....	.....	42,639.77	.....	44,449.81	17
4,076,197.71	161,057.67	.....	.....	.....	1,138.40	4,266,996.09	18
.....	.....	.....	.....	.....	.....	96.20	19
.....	.....	.....	.....	.....	.....	1,601.23	20
33,069.02	36,195.09	4,037.43	527.78	.....	.....	174,846.42	21
.....	.....	.....	.....	.....	.....	154.49	22
1,464.52	.....	.....	.....	.....	.....	3,806.57	23
278.01	.....	893.36	86,217.90	.....	.....	152,232.95	24
.....	.....	.....	.....	.....	.....	104.89	25
.....	9,656.00	.....	125.75	.....	.....	11,193.81	26
.....	.....	.....	.....	.....	271.37	26,690.23	27
6,346,954.11	2,620,602.13	1,152,502.69	1,938,518.97	194,160.08	13,831.35	16,188,179.30	
7,886,426.71	4,353,142.38	.....	.....	53,077.35	27,094.04	12,330,764.01	
9,934,134.18	5,169,027.16	.....	8,993.62	.....	3,996.91	35,792,588.17	
24,167,515.00	12,142,861.67	1,152,502.69	1,947,512.59	247,237.43	44,922.30	64,311,531.48	

V.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES 0.992) OF DOMESTIC BULLION NOT DISTRIBUTED, BY WEIGHT,

	Sources.	COINAGE MINTS.			
		Philadelphia.	San Francisco.	Carson.	New Orleans.
		Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
1	Alabama	1.79			55.91
2	Alaska	48.03	1,052.44	0.38	
3	Arizona	177.32	5,795.38	22,745.34	
4	California	5.86	19,821.00		
5	Colorado	65.41	9.06		
6	Georgia	69.33			
7	Idaho	29.02	517.93		
8	Iowa	.39			
9	Maryland	.41			
10	Michigan	807.33			
11	Minnesota	30.67			
12	Montana	1,476.83	7.63		
13	Nevada	4.69	1,221.12	208,141.39	
14	New Mexico	4.91	29.68		29.79
15	North Carolina	70.99			
16	Oregon		1,779.80		
17	South Carolina	41.11			
18	South Dakota	145.89			
19	Tennessee	.50			
20	Texas				2.56
21	Utah		1,461.59		
22	Vermont	1.54			
23	Virginia	5.83			
24	Washington	23.07	766.49		
25	West Virginia	1.71			
26	Wyoming	16.92			
27	Other sources	368.81	3.42		
	Total unrefined	3,398.36	32,465.54	230,887.11	88.26
	Refinery bars (fineness below 0.992)				
	Refined bullion (fineness 0.992 and over)				
	Total domestic	3,398.36	32,465.54	230,887.11	88.26

AND TERRITORIES PRODUCING THE SAME, AND OF REFINERY BARS (FINENESS BELOW DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.	
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.		
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	
.....	.....	.....	.....	20.19	9.72	87.61	1
11.71	78.05	.....	.....	.....	.....	1,190.61	2
173.35	796.61	.....	.....	.....	1.01	29,689.01	3
12.01	72.68	.....	.....	.....	.....	19,911.55	4
3,987.82	43,199.80	.....	.....	.....	189.67	47,451.76	5
1.21	.....	.....	.....	631.53	.....	702.07	6
175.17	5.49	7,182.95	3,520.40	.....	.....	11,430.96	7
.....	.....	.....	.....	.....	.....	.39	8
.....	.....	.....	.....	.....	.....	.41	9
26,725.38	.....	.....	.....	.....	.....	27,532.71	10
.....	.....	.....	.....	.....	.....	30.67	11
21,221.77	12.48	179.16	22,704.08	.....	.....	45,601.95	12
150,364.62	.....	.....	.....	.....	.....	359,781.82	13
24,799.61	832.14	.....	.....	.....	8.96	25,705.09	14
8.23	.....	.....	.....	279.06	.....	358.28	15
.....	17.48	7,313.89	474.95	.....	.....	9,586.12	16
.....	.....	.....	.....	226.99	.....	268.10	17
38,826.31	633.41	.....	.....	.....	1.84	39,607.45	18
.....	.....	.....	.....	.....	.....	.50	19
.....	.....	.....	.....	.....	.....	2.56	20
3,696.77	1,245.12	22.28	.09	.....	.....	6,425.85	21
.....	.....	.....	.....	.....	.....	1.54	22
.04	.....	.....	.....	.....	.....	5.87	23
5.03	.....	7.14	1,091.13	.....	.....	1,892.86	24
.....	.....	.....	.....	.....	.....	1.71	25
.....	71.17	.....	.45	.....	.....	88.54	26
.....	.....	.....	.....	.....	2.36	374.59	27
270,009.03	46,964.43	14,705.42	27,791.10	1,157.77	213.56	627,680.58	
130,203.02	10,192.24	.....	.....	1.85	24.57	140,421.68	
4,417,402.99	.....	.....	.....	.....	.....	4,417,402.99	
4,817,615.04	57,156.67	14,705.42	27,791.10	1,159.62	238.13	5,185,505.25	

VI.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES 0.992) OF DOMESTIC BULLION NOT DISTRIBUTED, BY VALUE,

	Sources.	COINAGE MINTS.			
		Philadelphia.	San Francisco.	Carson.	New Orleans.
1	Alabama	$2.08			$65.06
2	Alaska	55.89	$1,224.66		
3	Arizona	206.34	6,743.71	$0.44	
4	California	6.82	23,064.44	26,467.30	
5	Colorado	76.11	10.54		
6	Georgia	80.67			
7	Idaho	33.77	602.68		
8	Iowa	.45			
9	Maryland	.48			
10	Michigan	939.44			
11	Minnesota	35.69			
12	Montana	1,718.49	8.88		
13	Nevada	5.46	1,420.94	242,200.89	
14	New Mexico	5.71	34.54		34.66
15	North Carolina	82.61			
16	Oregon		2,071.04		
17	South Carolina	47.84			
18	South Dakota	169.76			
19	Tennessee	.58			
20	Texas				2.98
21	Utah		1,700.76		
22	Vermont	1.79			
23	Virginia	6.78			
24	Washington	26.85	891.91		
25	West Virginia	1.99			
26	Wyoming	19.69			
27	Other sources	429.16	3.98		
	Total unrefined	3,954.45	37,778.08	268,668.63	102.70
	Refinery bars (fineness below 0.992)				
	Refined bullion (fineness 0.992 and over)				
	Total domestic	3,954.45	37,778.08	268,668.63	102.70

AND TERRITORIES PRODUCING THE SAME, AND OF REFINERY BARS (FINENESS BELOW DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.	
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.		
.....	.....	.....	.....	$23.49	$11.31	$101.94	1
$13.62	$90.82	.....	.....	.....	.....	1,384.99	2
201.72	926.96	.....	.....	.....	1.18	8,080.35	3
13.98	84.57	.....	.....	.....	.....	49,637.11	4
4,640.37	50,268.86	.....	.....	.....	220.70	55,216.58	5
1.41	.....	.....	.....	734.87	.....	816.95	6
203.83	6.39	$8,358.34	$4,096.46	.....	.....	13,301.47	7
.....	.....	.....	.....	.....	.....	.45	8
.....	.....	.....	.....	.....	.....	.48	9
31,098.62	.....	.....	.....	.....	.....	32,038.06	10
.....	.....	.....	.....	.....	.....	35.69	11
24,694.42	14.52	208.48	26,419.29	.....	.....	53,064.08	12
174,969.74	.....	.....	.....	.....	.....	418,597.03	13
28,857.73	968.31	.....	.....	.....	10.43	29,911.38	14
9.58	.....	.....	.....	324.73	.....	416.92	15
.....	20.34	8,510.71	552.68	.....	.....	11,154.77	16
.....	.....	.....	.....	264.13	.....	311.97	17
45,179.70	737.06	.....	.....	.....	2.14	46,088.66	18
.....	.....	.....	.....	.....	.....	.58	19
.....	.....	.....	.....	.....	.....	2.98	20
4,301.70	1,448.87	25.92	.10	.....	.....	7,477.35	21
.....	.....	.....	.....	.....	.....	1.79	22
.05	.....	.....	.....	.....	.....	6.83	23
5.85	.....	8.31	1,269.68	.....	.....	2,202.60	24
.....	.....	.....	.....	.....	.....	1.99	25
.....	82.82	.....	.52	.....	.....	103.03	26
.....	.....	.....	.....	.....	2.75	435.89	27
314,192.32	54,649.52	17,111.76	32,338.73	1,347.22	248.51	730,391.92	
151,508.97	11,860.06	.....	.....	2.15	28.59	163,399.77	
5,140,250.75	.....	.....	.....	.....	.....	5,140,250.75	
5,605,952.04	66,509.58	17,111.76	32,338.73	1,349.37	277.10	6,034,042.44	

VII.—BARS MANUFACTURED OF GOLD AND SILVER, BY WEIGHT,

Description.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Fine bars	35,389.105		23,971.175	15.392
Mint bars				
Standard bars				
Unparted bars				
Total gold	35,389.105		23,971.175	15.392
SILVER.				
Fine bars	57,932.22	2,140.01	188,253.75	3,552.46
Mint bars				
Standard bars				
Unparted bars				
Total silver	57,932.22	2,140.01	188,253.75	3,552.46

VIII.—BARS MANUFACTURED OF GOLD AND SILVER, BY VALUE,

Description.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.				
Fine bars	$658,401.95		$445,975.35	$286.36
Mint bars				
Standard bars				
Unparted bars				
Total gold	658,401.95		445,975.35	286.36
SILVER.				
Fine bars	67,412.04	$2,490.19	219,058.91	4,133.77
Mint bars				
Standard bars				
Unparted bars				
Total silver	67,412.04	2,490.19	219,058.91	4,133.77
Total gold and silver	725,813.99	2,490.19	665,034.26	4,420.13

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
1,426,971.025	277,835.210	.....	.....	.....	.....	1,764,181.907
296,201.648	13.715	.....	.....	.....	.....	296,215.363
2,579.131	.....	.....	.....	.....	.....	2,579.131
.....	377,501.489	74,997.087	122,399.862	13,416.005	5,187.555	593,501.998
1,725,751.804	655,350.414	74,997.087	122,399.862	13,416.005	5,187.555	2,656,478.399
5,858,637.93	.....	.....	.....	.....	.....	6,110,516.37
97,022.65	.....	.....	.....	.....	.....	97,022.65
.....	.....	.....	.....	.....	.....	.....
.....	58,245.38	17,398.63	33,005.23	1,220.85	1,140.72	111,010.81
5,955,660.58	58,245.38	17,398.63	33,005.23	1,220.85	1,140.72	6,318,549.83

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
$26,548,298.14	$5,169,027.16	.....	.....	.....	.....	$32,821,988.96
5,510,728.33	255.16	.....	.....	.....	.....	5,510,983.49
47,983.83	.....	.....	.....	.....	.....	47,983.83
.....	7,023,283.52	$1,395,294.64	$2,277,206.72	$249,600.09	$96,512.65	11,041,897.62
32,107,010.30	12,192,565.84	1,395,294.64	2,277,206.72	249,600.09	96,512.65	49,422,853.90
6,817,324.14	.....	.....	.....	.....	.....	7,110,419.05
112,899.08	.....	.....	.....	.....	.....	112,899.08
.....	.....	.....	.....	.....	.....	.....
.....	67,776.44	20,245.68	38,406.08	1,420.62	1,327.38	129,176.20
6,930,223.22	67,776.44	20,245.68	38,406.08	1,420.62	1,327.38	7,352,494.33
39,037,233.52	12,260,342.28	1,415,540.32	2,315,612.80	251,020.71	97,840.03	56,775,348.23

IX.—Statement of Domestic Mutilated and Uncurrent Gold and Silver for Recoinage, showing Weight, Face Value, Coinage Value,

Denomination.	Philadelphia.		San Francisco.	
	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.
GOLD.				
Double eagles	$101,340.00	$30,800.00	.....	$3,520.00
Eagles	110,890.00	27,890.00	.....	1,280.00
Half eagles	146,190.00	29,735.00	.....	2,220.00
Three-dollar pieces	15.00	114.00	.....	12.00
Quarter eagles	1,077.50	2,362.50	.....	132.50
Dollars	32.00	384.00	.....	37.00
Total gold, face value	359,544.50	81,285.50	.....	7,201.50
SILVER.				
Trade dollars	.....	317.00	.....	.....
Standard dollars	.....	1,406.00	.....	.....
Half dollars	2,727,515.50	748.00	$294,000.00	103.00
Quarter dollars	1,598,577.00	648.50	150,000.00	69.00
Twenty-cent pieces	109.60	.....	.....	.....
Dimes	271,563.40	564.20	92,000.00	83.00
Half dimes	1,159.80	62.60	.....	247.40
Three-cent pieces	74.70	4.65	.....	.....
Total silver, face value	4,599,000.00	3,750.95	536,000.00	502.40
SUMMARY.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Gold coin	19,186.460	4,337.353	.....	332.810
Silver coin	3,535,465.08	3,004.69	411,524.02	365.10
Gold, coining value	$356,957.40	$80,694.94	.....	$6,191.81
Silver, subsidiary, coining value	4,398,712.40	3,738.34	$512,005.00	454.24
Silver, dollar, coining value	4,113,995.72	3,496.37	478,864.32	424.84
Loss, gold	2,587.10	590.56	.....	1,009.69
Loss, silver, subsidiary	200,287.60	12.61	23,995.00	48.16

COINS TRANSFERRED FROM THE TREASURY AND PURCHASED OVER THE COUNTER AND LOSS DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

NEW ORLEANS.		NEW YORK.	DENVER.	ST. LOUIS.	TOTAL.		
Received from Treasury.	Purchased.	Purchased.	Purchased.	Purchased.	Received from Treasury.	Purchased.	Received from Treasury and purchased.
.....	$1,580.00	$86,780.00	$60.00	$1,300.00	$101,340.00	$124,040.00	$225,380.00
.....	1,380.00	104,920.00	10.00	490.00	110,890.00	125,970.00	236,860.00
.....	6,425.00	90,995.00	35.00	205.00	146,190.00	129,615.00	275,805.00
.....	6.00	87.00	3.00	9.00	15.00	231.00	246.00
.....	177.50	7,905.00	7.50	10.00	1,077.50	10,595.00	11,672.50
.....	133.00	137.00	1.00	.....	32.00	692.00	724.00
.....	9,701.50	290,824.00	116.50	2,014.00	359,544.50	391,143.00	750,687.50
.....	1.00	.....	.....	.....	.....	318.00	318.00
.....	261.00	.....	.....	.....	.....	1,667.00	1,667.00
$468,000.00	112.00	.....	.....	.....	3,489,515.50	963.00	3,490,478.50
175,050.00	95.00	.....	.....	.....	1,923,627.00	812.50	1,924,439.50
120.00	.....	.....	.....	.....	229.60	.....	229.60
28,075.00	345.20	.....	.....	.....	391,638.40	992.40	392,630.80
165.00	355.30	.....	.....	.....	1,324.80	665.30	1,990.10
.....	.....	.....	.....	.....	74.70	4.65	79.35
671,410.00	1,169.50	.....	.....	.....	5,806,410.00	5,422.85	5,811,832.85
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
.....	513.980	15,476.531	6.090	106.893	19,186.460	20,773.657	39,960.117
510,911.20	865.05	.....	.....	.....	4,457,900.30	4,234.84	4,462,135.14
.....	$9,562.42	$287,935.46	$113.31	$1,988.71	$356,957.40	$386,486.65	$743,444.05
$635,659.35	1,076.27	.....	.....	.....	5,546,376.75	5,268.85	5,551,645.60
594,514.85	1,006.60	.....	.....	.....	5,187,374.89	4,927.81	5,192,302.70
.....	139.08	2,888.54	3.19	25.29	2,587.10	4,656.35	7,243.45
35,750.65	93.23	.....	.....	.....	260,033.25	154.00	260,187.25

X.—Quantity and Cost of Silver Used in the Coinage of Silver Dollars during the Calendar Year 1897, under Act of July 14, 1890.

MINT AT PHILADELPHIA.

Months.	Coined.		Dollars coined.	Seigniorage.
	Standard ounces.	Cost.		
1897.				
January	663,437.50	$540,444.35	772,000	$231,555.65
February				
March	214.84	175.01	250	74.99
April				
May				
June	515,711.80	420,105.18	600,101	179,995.82
July				
August				
September	85,980.47	70,040.75	100,050	30,009.25
October	85,937.50	70,005.75	100,000	29,994.25
November	386,718.75	315,025.85	450,000	134,974.15
December	687,783.59	560,276.98	800,330	240,053.02
Total	2,425,784.45	1,976,073.87	2,822,731	846,657.13

MINT AT SAN FRANCISCO.

1897.				
January	687,500.00	$554,048.76	800,000	$245,951.24
February	687,500.00	554,048.76	800,000	245,951.24
March	687,500.00	554,048.76	800,000	245,951.24
April	687,500.00	554,048.75	800,000	245,951.25
May	687,500.00	554,048.75	800,000	245,951.25
June	408,203.12	328,966.44	475,000	146,033.56
July				
August				
September				
October	257,812.50	207,768.28	300,000	92,231.72
November	515,625.00	415,536.57	600,000	184,463.43
December	386,718.75	311,652.43	450,000	138,347.57
Total	5,005,859.37	4,034,167.50	5,825,000	1,790,832.50

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS DURING THE CALENDAR YEAR 1897—Continued.

MINT AT NEW ORLEANS.

Months.	COINED.		Dollars coined.	Seigniorage.
	Standard ounces.	Cost.		
1897.				
January	206,250.00	$159,391.03	240,000	$80,608.97
February	464,062.50	358,629.81	540,000	181,370.19
March	515,625.00	398,477.56	600,000	201,522.44
April	515,625.00	398,477.56	600,000	201,522.44
May	515,625.00	398,477.57	600,000	201,522.43
June	343,750.00	265,651.71	400,000	134,348.29
July				
August				
September				
October	189,062.50	146,108.44	220,000	73,891.56
November	386,718.75	298,858.17	450,000	151,141.83
December	304,218.75	235,101.76	354,000	118,898.24
Total	3,440,937.50	2,659,173.61	4,004,000	1,344,826.39

RECAPITULATION.

1897.				
January	1,557,187.50	$1,253,884.14	1,812,000	$558,115.86
February	1,151,562.50	912,678.57	1,340,000	427,321.43
March	1,203,339.84	952,701.33	1,400,250	447,548.67
April	1,203,125.00	952,526.31	1,400,000	447,473.69
May	1,203,125.00	952,526.32	1,400,000	447,473.68
June	1,267,664.92	1,014,723.33	1,475,101	460,377.67
July				
August				
September	85,980.47	70,040.75	100,050	30,009.25
October	532,812.50	423,882.47	620,000	196,117.53
November	1,289,062.50	1,029,420.59	1,500,000	470,579.41
December	1,378,721.09	1,107,031.17	1,604,330	497,298.83
Total	10,872,581.32	8,669,414.98	12,651,731	3,982,316.02

XI.—QUANTITY AND COST OF METAL OBTAINED, BY TRANSFER AND PURCHASE, FOR SUBSIDIARY SILVER COINAGE, AND COINAGE DERIVED THEREFROM, DURING THE CALENDAR YEAR 1897.

Sources from which bullion was obtained.	Fine ounces.	Cost.	Coinage.
MINT AT PHILADELPHIA.			
Worn and uncurrent coin	3,181,918.57	$4,398,712.40	$4,280,853.30
Partings, charges, and fractions purchased	199,946.51	124,746.32	81,621.35
Melted assay coins purchased	877.20	1,150.60	
Mutilated coins purchased	1,777.66	1,088.96	
Surplus bullion purchased	2,154.58	1,433.54	
Total	3,386,674.52	4,527,131.82	4,362,474.65
MINT AT SAN FRANCISCO.			
Worn and uncurrent coin	370,371.62	512,005.00	674,791.65
Partings, charges, and fractions purchased	49,401.96	28,933.67	62,000.00
Mutilated coins purchased	328.59	178.97	
Surplus bullion purchased	8,472.44	5,552.46	
Total	428,574.63	546,670.10	736,791.65
MINT AT NEW ORLEANS.			
Worn and uncurrent coin	459,820.06	635,659.35	736,300.00
Partings, charges, and fractions purchased	5,027.82	2,946.66	.....
Mutilated coins purchased	778.54	434.08	.....
Surplus bullion purchased	208.26	131.40	.....
Total	465,834.70	639,171.49	736,300.00
MINT AT CARSON.			
Partings, charges, and fractions purchased	1,688.50	991.63	.....
Surplus bullion purchased	287.45	178.55	.....
Total	1,975.95	1,170.18	.....
SUMMARY.			
Worn and uncurrent coin	4,012,110.27	5,546,376.75	5,691,944.95
Partings, charges, and fractions purchased	256,064.81	157,618.28	143,621.35
Melted assay coins purchased	877.20	1,150.60	
Mutilated coins purchased	2,884.79	1,702.01	
Surplus bullion purchased	11,122.73	7,295.95	
Total	4,283,059.80	5,714,143.59	5,835,566.30

XII.—SILVER FOR SUBSIDIARY

Stock.	PHILADELPHIA.		SAN FRANCISCO.	
	Fine ounces.	Cost.	Fine ounces.	Cost.
Silver bullion on hand January 1, 1897	731,019.36	$901,541.45	242,890.76	$300,452.05
Uncurrent coins transferred from Treasury	3,181,918.57	4,398,712.40	370,371.62	512,005.00
Partings, charges, and fractions purchased	199,946.51	124,746.32	49,401.98	28,983.67
Melted assay coins purchased	877.20	1,150.60	.....	.....
Mutilated coins purchased	1,777.66	1,088.96	328.59	178.97
Surplus bullion purchased	2,154.58	1,433.54	8,472.44	5,552.46
Total	4,117,693.88	5,428,673.27	671,465.39	847,122.15
Used in coinage calendar year 1897	3,155,705.10	4,320,132.45	532,976.67	702,785.56
Transferred	.....	.....	.....	.....
Sold in sweeps	6,094.66	4,063.46	3,590.08	2,352.78
Wasted by operative officers	1,817.44	1,209.22	3,558.27	2,331.93
Balance on hand January 1, 1898	954,076.68	1,103,268.14	131,340.37	139,651.88
Total	4,117,693.88	5,428,673.27	671,465.39	847,122.15

OINAGE, CALENDAR YEAR 1897.

NEW ORLEANS.		CARSON.		SUMMARY.	
Fine ounces.	Cost.	Fine ounces.	Cost.	Fine ounces.	Cost.
78,647.62	$108,216.94	5,244.58	$3,265.08	1,057,802.32	$1,313,475.52
459,820.08	635,659.35	.....	.....	4,012,110.27	5,546,376.75
5,027.82	2,946.66	1,688.50	991.63	256,064.81	157,618.28
.....	.....	.....	.....	877.20	1,150.60
778.54	434.08	.....	.....	2,884.79	1,702.01
208.26	131.40	287.45	178.55	11,122.73	7,295.95
544,482.32	747,388.43	7,220.53	4,435.26	5,340,862.12	7,027,619.11
532,621.01	736,300.00	.....	.....	4,221,302.78	5,759,218.01
.....	.....	.....	.....	.....	.....
5,441.14	3,278.92	356.07	222.63	15,481.95	9,917.79
160.80	101.46	.....	.....	5,536.51	3,642.61
6,259.37	7,708.05	6,864.46	4,212.63	1,098,540.88	1,254,840.70
544,482.32	747,388.43	7,220.53	4,435.26	5,340,862.12	7,027,619.11

XIII.—COINAGE EXECUTED AT THE MINTS OF THE UNITED STATES

Denominations.	PHILADELPHIA.	
	Pieces.	Value.
GOLD.		
Double eagles	1,383,261	$27,665,220.00
Eagles	1,000,159	10,001,590.00
Half eagles	867,883	4,339,415.00
Quarter eagles	29,904	74,760.00
Total gold	3,281,207	42,080,985.00
SILVER.		
Dollars, act July 14, 1890	2,822,731	2,822,731.00
Subsidiary:		
Half dollars	2,480,731	1,240,365.50
Quarter dollars	8,140,731	2,035,182.75
Dimes	10,869,264	1,086,926.40
Total subsidiary	21,490,726	4,362,474.65
Total silver	24,313,457	7,185,205.65
MINOR.		
Five-cent nickel	20,428,735	1,021,436.75
One-cent bronze	50,466,330	504,663.30
Total minor	70,895,065	1,526,100.05
Total coinage	98,489,729	50,792,290.70

There were coined in addition to the above, by the mint at Philadelphia, 60,017 gold ten-colone pieces of the value $279,291.81; and also 20,000 gold twenty-colone planchets of the value of $186,141.02 prepared and delivered to the Government of Costa Rica.

For the Government of San Domingo the following silver coinage:

Denomination.	Good pieces struck.	Imperfect strikes and blanks.	Total pieces handled.
Pesos	302,441	3,737	306,178
Medio pesos	303,028	4,220	307,248
20-centavos	380,720	3,800	384,520
10-centavos	759,715	4,671	764,386
Total	1,745,904	16,428	1,762,332

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

SAN FRANCISCO.		NEW ORLEANS.		TOTAL.	
Pieces	Value.	Pieces.	Value.	Pieces.	Value.
1,470,250	$29,405,000.00	.....	.....	2,853,511	$57,070,220.00
234,750	2,347,500.00	42,500	$425,000.00	1,277,409	12,774,090.00
354,000	1,770,000.00	.....	.....	1,221,883	6,109,415.00
.....	.....	.....	.....	29,904	74,760.00
2,059,000	33,522,500.00	42,500	425,000.00	5,382,707	76,028,485.00
5,825,000	5,825,000.00	4,004,000	4,004,000.00	12,651,731	12,651,731.00
933,900	466,950.00	632,000	316,000.00	4,046,631	2,023,315.50
542,229	135,557.25	1,414,800	353,700.00	10,097,760	2,524,440.00
1,342,844	134,284.40	666,000	66,600.00	12,878,108	1,287,810.80
2,818,973	736,791.65	2,712,800	736,300.00	27,022,499	5,835,566.30
8,643,973	6,561,791.65	6,716,800	4,740,300.00	39,674,230	18,487,297.30
.....	.....	.....	.....	20,428,735	1,021,436.75
.....	.....	.....	.....	50,466,330	504,663.30
.....	.....	.....	.....	70,895,065	1,526,100.05
10,702,973	40,084,291.65	6,759,300	5,165,300.00	115,952,002	96,041,882.35

Coinage of silver dollars under—

Bland-Allison Act of February 28, 1878		$378,166,793
Sherman Act of July 14, 1890, to October 31 1893	$36,087,285	
From repeal of the purchasing clause of the Sherman Act, November 1, 1893, to December 31, 1897	36,485,572	
		72,572,857
Act of March 3, 1891		5,078,472
Total		455,818,122

XIV.—Assets and Liabilities of the United States

ASSETS.

Institutions.	Gold bullion.		Silver bullion.		Value of bullion shipped for coinage.
	Standard ounces.	Value.	Standard ounces.	Value (cost).	
COINAGE MINTS.					
Philadelphia	734, 508. 338	$13, 665, 271. 41	122, 167, 920. 56	$99, 759, 201. 48	.....
San Francisco	221, 090. 774	4, 113, 316. 62	2, 921, 464. 88	2, 376, 422. 17	.....
New Orleans	18, 135. 386	337, 402. 73	470, 879. 04	366, 230. 97	.....
Carson	23, 788. 814	442, 582. 59	638, 717. 70	458, 923. 58	$89, 169. 18
ASSAY OFFICES.					
New York	1, 409, 455. 932	26, 222, 436. 02	666, 346. 89	589, 747. 30	.....
Denver	22, 791. 098	424, 020. 44	2, 146. 62	1, 073. 31	257, 081. 44
Helena	1, 887. 348	35, 113. 47	494. 02	247. 01	51, 208. 33
Boise	1, 331. 941	24, 780. 31	260. 42	130. 21	.....
Charlotte	328. 297	6, 107. 86	51. 22	25. 61	.....
St. Louis	429. 885	7, 997. 72	62. 54	30. 76	.....
Total	2, 433, 747. 813	45, 279, 029. 17	126, 868, 343. 89	103, 552, 632. 40	397, 458. 95

LIABILITIES.

Institutions.	Bullion fund.	Undeposited earnings.
COINAGE MINTS.		
Philadelphia	$189, 610, 472. 61	.....
San Francisco	54, 213, 111. 24	.....
New Orleans	14, 518, 420. 63	.....
Carson	6, 217, 360. 63	$26. 47
ASSAY OFFICES.		
New York	29, 688, 280. 03	13, 581. 03
Denver	1, 105, 781. 88	2, 767. 88
Helena	255, 306. 21	1, 646. 13
Boise	73, 114. 02	508. 62
Charlotte	23, 523. 49	161. 95
St. Louis	20, 134. 54	116. 13
Total	295, 725, 505. 28	18, 808. 21

MINTS AND ASSAY OFFICES, DECEMBER 31, 1897.

ASSETS.

Gold coin.	Silver coin.	Credit balance with assistant treasurers and depository banks.	Minor coin.	Minor coinage metal.	Deficiencies.	Total.
$9,707,577.50	$66,712,055.61	.....	$184,106.36	$46,852.78	$13,706.82	$190,090,771.96
1,053,070.00	46,604,073.70	.....	.....	.....	413,557.96	54,560,440.45
61,260.00	13,847,498.96	.....	.....	.....	25,000.00	14,637,392.66
5,678.97	5,070,729.82	a $74,753.21	.....	.....	75,549.75	6,217,387.10
35,440.00	1,916.88	b 2,915,781.10	.....	.....	.....	29,765,321.30
.....	.....	426,374.57	.....	.....	.....	1,108,549.76
.....	.....	170,383.53	.....	.....	.....	256,952.34
.....	.....	48,712.12	.....	.....	.....	73,622.64
.....	.....	17,551.97	.....	.....	.....	23,685.44
.....	.....	12,222.19	.....	.....	.....	20,250.67
10,863,026.47	132,236,274.97	3,665,778.69	184,106.36	48,852.78	527,814.53	296,754,374.32

a Gold coin. b Gold coin, $2,856,098.96; silver coin, $59,682.14.

LIABILITIES.

Seigniorage on silver.	Unpaid depositors.	Minor coinage profits.	Minor coin metal fund.	Unpaid cent depositors and subtreasury transfers.	Total.
$240,205.27	$7,134.94	$167,109.14	$36,200.00	$29,650.00	$190,090,771.96
172,353.66	174,975.55	.....	.....	.....	54,560,440.45
118,898.24	73.79	.....	.....	.....	14,637,392.66
.....	.....	.....	.....	.....	6,217,387.10
.....	63,460.24	.....	.....	.....	29,765,321.30
.....	.....	.....	.....	.....	1,108,549.76
.....	.....	.....	.....	.....	256,952.34
.....	.....	.....	.....	.....	73,622.64
.....	.....	.....	.....	.....	23,685.44
.....	.....	.....	.....	.....	20,250.67
531,457.17	245,644.52	167,109.14	36,200.00	29,650.00	296,754,374.32

XV.—UNREFINED GOLD AND SILVER OF DOMESTIC PRODUCTION, BY VALUE, ITS DISTRIBUTION, BY STATES AND TERRITORIES; ALSO REFINED DOMESTIC BULLION (NOT DISTRIBUTED) DEPOSITED AT THE MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

Localities.	Gold.	Silver.	Total.
Alabama	$260,841.26	$469.81	$261,311.07
Alaska	2,537,783.34	28,363.06	2,566,146.40
Arizona	8,909,817.99	14,117,738.40	23,027,556.39
California	776,268,535.53	4,389,140.81	780,657,676.34
Connecticut	125.82	.....	125.82
Colorado	76,169,763.09	25,006,122.59	101,175,885.68
Georgia	9,611,772.89	8,889.87	9,620,662.76
Idaho	38,357,090.01	2,010,669.73	40,367,759.74
Iowa	1,169.54	6.42	1,175.96
Maine	6,311.06	22.90	6,333.96
Maryland	18,008.91	41.83	18,050.74
Michigan	501,991.91	4,183,502.84	4,685,494.75
Minnesota	8,912.89	114.08	9,026.97
Missouri	96.71	359.11	455.82
Montana	79,070,112.19	22,243,493.08	101,313,605.27
Nebraska	2,340.26	273,226.13	275,566.39
Nevada	38,955,646.79	105,091,612.06	144,047,258.85
New Hampshire	481.34	1.75	483.09
New Mexico	6,619,649.77	7,144,207.54	13,763,857.31
North Carolina	11,906,298.28	67,958.01	11,974,256.29
Oregon	24,059,841.69	120,952.23	24,180,793.92
South Carolina	2,555,609.13	5,136.39	2,560,745.52
South Dakota	62,153,515.43	1,190,009.83	63,343,525.26
Tennessee	91,513.28	16.91	91,530.19
Texas	10,442.43	3,457.51	13,899.94
Utah	2,002,179.13	19,943,281.08	21,945,460.21
Vermont	79,791.87	93.68	79,885.55
Virginia	1,771,050.78	474.60	1,771,525.38
Washington	1,453,012.85	20,665.98	1,473,678.83
West Virginia	104.89	1.99	106.88
Wisconsin	325.73	7.02	332.75
Wyoming	901,066.68	13,511.66	914,578.34
Other sources	42,173,852.38	42,962,128.86	85,135,981.24
Unrefined	1,186,459,055.85	248,825,677.76	1,435,284,733.61
Refined	573,060,406.81	544,180,060.69	1,117,240,467.50
Total	1,759,519,462.66	793,005,738.45	2,552,525,201.11

XVI.—Product of Gold and Silver in the United States from 1792 to 1844, and Annually Since.

[The estimate for 1792-1873 is by R. W. Raymond, commissioner, and since by Director of the Mint.]

Years.	Gold.	Silver.	Total.
April 2, 1792-July 31, 1834	$14,000,000	Insignificant.	$14,000,000
July 31, 1834-December 31, 1844	7,500,000	$250,000	7,750,000
1845	1,008,327	50,000	1,058,327
1846	1,139,357	50,000	1,189,357
1847	889,085	50,000	939,085
1848	10,000,000	50,000	10,050,000
1849	40,000,000	50,000	40,050,000
1850	50,000,000	50,000	50,050,000
1851	55,000,000	50,000	55,050,000
1852	60,000,000	50,000	60,050,000
1853	65,000,000	50,000	65,050,000
1854	60,000,000	50,000	60,050,000
1855	55,000,000	50,000	55,050,000
1856	55,000,000	50,000	55,050,000
1857	55,000,000	50,000	55,050,000
1858	50,000,000	500,000	50,500,000
1859	50,000,000	100,000	50,100,000
1860	46,000,000	150,000	46,150,000
1861	43,000,000	2,000,000	45,000,000
1862	39,200,000	4,500,000	43,700,000
1863	40,000,000	8,500,000	48,500,000
1864	46,100,000	11,000,000	57,100,000
1865	53,225,000	11,250,000	64,475,000
1866	53,500,000	10,000,000	63,500,000
1867	51,725,000	13,500,000	65,225,000
1868	48,000,000	12,000,000	60,000,000
1869	49,500,000	12,000,000	61,500,000
1870	50,000,000	16,000,000	66,000,000
1871	43,500,000	23,000,000	66,500,000
1872	36,000,000	28,750,000	64,750,000
1873	36,000,000	35,750,000	71,750,000
1874	33,500,000	37,300,000	70,800,000
1875	33,400,000	31,700,000	65,100,000
1876	39,900,000	38,800,000	78,700,000
1877	46,900,000	39,800,000	86,700,000
1878	51,200,000	45,200,000	96,400,000
1879	38,900,000	40,800,000	79,700,000
1880	36,000,000	39,200,000	75,200,000
1881	34,700,000	43,000,000	77,700,000
1882	32,500,000	46,800,000	79,300,000
1883	30,000,000	46,200,000	76,200,000
1884	30,800,000	48,800,000	79,600,000
1885	31,800,000	51,600,000	83,400,000
1886	35,000,000	51,000,000	86,000,000
1887	33,000,000	53,350,000	86,350,000
1888	33,175,000	59,195,000	92,370,000
1889	32,800,000	64,646,000	97,446,000
1890	32,845,000	70,465,000	103,310,000
1891	33,175,000	75,417,000	108,592,000
1892	33,000,000	82,101,000	115,101,000
1893	35,955,000	77,576,000	113,531,000
1894	39,500,000	64,000,000	103,500,000

XVI.—PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FROM 1792 TO 1844, AND ANNUALLY SINCE—Continued.

Years.	Gold.	Silver.	Total.
1895	$46,610,000	$72,051,000	$118,661,000
1896	53,088,000	76,069,000	129,157,000
1897	57,363,000	69,637,000	127,000,000
Total	2,170,397,769	1,514,607,000	3,685,004,769

XVII.—PRECIOUS-METAL PRODUCT, UNITED STATES AND MEXICO.

WELLS, FARGO & COMPANY,
San Francisco, December 31, 1897.

DEAR SIR: The following is our annual report of precious metals produced in the States and Territories west of the Missouri River (including British Columbia) during 1897, which shows in the aggregate: Gold, $69,830,597; silver, $37,184,034; copper, $36,645,694; lead, $9,775,144; total gross result, $153,435,469. The "commercial" value at which the several metals named herein have been estimated is: Silver, 60 cents per ounce; copper, 11 cents per pound, and lead, $3.38 per hundredweight.

Allowance must always be made for probable variations from reported figures by reason of constantly increasing facilities for transporting bullion, ores, and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guesswork; but with some modifications on this account made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

States and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total.
California	$12,546,766	$5,075,193	$12,948	$1,195,917	$18,830,824
Nevada	1,290,966	1,341,374	451,453	234,052	3,317,845
Oregon	1,593,072	811,725	45,000	11,900	2,461,697
Washington	271,949	200,000	70,000	26,160	568,109
Alaska	.....	3,571,000	.....	52,000	3,623,000
Idaho	2,725,000	.....	4,555,600	2,741,000	10,021,600
Montana	4,450,000	.....	9,452,000	26,325,500	40,227,500
Utah	798,441	864,813	813,748	6,770,440	9,247,442
Colorado	18,326,554	.....	12,869,783	3,780,492	34,976,829
New Mexico	213,678	320,000	153,348	193,000	880,026
Arizona	1,555,873	1,837,118	143,693	8,698,821	12,235,505
Dakota	5,829,575	.....	220,000	36,000	6,085,575
Texas	5,000	.....	309,717	1,800	316,517
Wyoming	27,500	.....	31,000	2,500	61,000
British Columbia and Northwest Territory	6,175,000	.....	3,150,000	1,257,000	10,582,000
Total	55,809,374	14,021,223	32,278,290	51,326,582	153,435,469

The gross yield for 1897, shown above, segregated, is approximately as follows:

Metal.	Per cent of total.	Total value.
Gold	$45\frac{11}{100}$	$69,830,597
Silver	$24\frac{11}{100}$	37,184,034
Copper	$23\frac{88}{100}$	36,645,694
Lead	$6\frac{37}{100}$	9,775,144
Total	.....	153,435,469

The year's combined product of the metals herein treated of is the greatest in the history of the country, that of gold, $69,830,597, being above any previous record officially reported; and the world's output of gold for 1897—approximately $240,000,000—is surprisingly large and more than 10 per cent greater than estimated by me six months ago. The most notable increases have been in the British possessions of the Northwest, Australasia, South Africa, the United States of America, and Mexico.

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER, AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1870–1897.

Year.	Production as per W., F. & Co.'s statements, including amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	The net products of the States and Territories west of the Missouri River, exclusive of British Columbia and west coast of Mexico, divided, are as follows:			
			Lead.	Copper.	Silver.	Gold.
1870	$54,000,000	$52,150,000	$1,080,000	.....	$17,320,000	$33,750,000
1871	58,284,000	55,784,000	2,100,000	.....	19,286,000	34,398,000
1872	62,236,959	60,351,824	2,250,000	.....	19,924,429	38,177,395
1873	72,258,693	70,139,860	3,450,000	.....	27,483,302	39,206,558
1874	74,401,045	71,965,610	3,800,000	.....	29,699,122	38,466,488
1875	80,889,057	76,703,433	5,100,000	.....	31,635,239	39,968,194
1876	90,875,173	87,219,859	5,040,000	.....	39,292,924	42,886,935
1877	98,421,754	95,811,582	5,085,250	.....	45,846,109	44,880,223
1878	81,154,622	78,276,167	3,452,000	.....	37,248,137	37,576,030
1879	75,349,501	72,688,888	4,185,769	.....	37,032,857	31,470,262
1880	80,167,936	77,232,512	5,742,390	$898,000	38,033,055	32,559,067
1881	84,504,417	81,198,474	6,361,902	1,195,000	42,987,613	30,653,959
1882	92,411,835	89,207,549	8,008,155	4,055,037	48,133,039	29,011,318
1883	90,313,612	84,639,212	8,163,550	5,683,921	42,975,101	27,816,640
1884	84,975,954	81,633,835	6,834,091	6,086,252	43,529,925	25,183,567
1885	90,181,260	87,311,382	8,562,991	7,838,036	44,516,599	26,393,756
1886	103,011,761	100,160,222	9,185,192	9,276,755	52,136,851	29,561,424
1887	104,645,959	103,327,770	9,631,073	10,362,746	50,833,884	32,500,067
1888	114,341,592	112,665,569	11,263,630	18,261,490	53,152,747	29,987,702
1889	127,677,836	126,723,384	14,593,323	14,793,763	64,808,637	32,527,661
1890	127,166,410	126,804,855	11,509,571	20,569,092	62,930,831	31,795,361
1891	118,237,441	117,946,565	12,385,780	13,261,663	60,614,004	31,685,118
1892	111,531,700	111,259,508	11,433,947	19,370,516	50,607,601	29,847,444
1893	104,081,591	103,827,623	7,756,040	23,631,339	38,491,521	33,948,723
1894	105,113,489	104,844,112	8,223,513	22,276,294	28,721,014	45,623,291
1895	118,164,642	117,896,988	7,170,367	27,052,115	35,274,777	48,399,729
1896	126,289,536	121,949,536	6,536,026	28,713,305	33,684,963	53,015,242
1897	153,435,469	142,853,469	8,775,144	36,388,694	34,034,034	63,655,597

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, $37,255,807; from San Francisco, $11,156,202. Total, $48,412,009, as against $44,102,381 last year. Pound sterling estimated at $4.8665.

STATEMENT OF THE PRODUCT OF GOLD AND SILVER IN THE REPUBLIC OF MEXICO, REVISED AND CORRECTED FROM 1877 TO 1897 VALUES UPON MINTAGE BASIS.

Years.	Gold.	Silver.	Total.
1877-1878	$747,000	$24,837,000	$25,584,000
1878-1879	881,000	25,125,000	26,006,000
1879-1880	942,000	26,800,000	27,742,000
1880-1881	1,013,000	29,234,000	30,247,000
1881-1882	937,000	29,329,000	30,266,000
1882-1883	956,000	29,569,000	30,525,000
1883-1884	1,055,000	31,695,000	32,750,000
1884-1885	914,000	33,226,000	34,140,000
1885-1886	1,026,000	34,112,000	35,138,000
1886-1887	1,047,000	34,600,000	35,647,000
1887-1888	1,031,000	34,912,000	35,943,000
1888-1889	1,040,000	40,706,000	41,746,000
1889-1890	1,100,000	41,500,000	42,600,000
1890-1891	1,150,000	43,000,000	44,150,000
1891-1892	1,275,000	45,750,000	47,025,000
1892-1893	1,400,000	48,500,000	49,900,000
1893-1894	1,425,000	47,250,000	48,675,000
1894-1895	4,750,000	54,225,000	58,975,000
1895-1896	5,475,000	54,450,000	59,925,000
1896-1897	8,500,000	60,683,000	69,183,000
Total	36,664,000	769,503,000	806,167,000

EXHIBIT OF COINAGE OF GOLD, SILVER, AND COPPER, IN THE REPUBLIC OF MEXICO, FROM THE 1ST OF JULY, 1873, TO THE 30TH OF JUNE, 1897.

Years.	Gold.	Silver.	Copper.
1873-1874	$866,743	$18,846,067	$15,966
1874-1875	862,619	19,386,958	21,712
1875-1876	809,401	19,454,054	30,654
1876-1877	695,750	21,415,128	9,035
1877-1878	691,998	22,084,203	41,364
1878-1879	658,206	22,162,987	16,300
1879-1880	521,826	24,018,528	14,035
1880-1881	492,068	24,617,395	42,258
1881-1882	452,590	25,146,260	11,972
1882-1883	407,600	24,083,921	.....
1883-1884	328,698	25,377,379	.....
1884-1885	423,250	25,840,728	.....
1885-1886	425,000	25,850,000	.....
1886-1887	410,000	25,600,000	.....
1887-1888	340,320	26,711,000	.....
1888-1889	305,100	25,274,500	.....
1889-1890	243,298	24,328,326	.....
1890-1891	308,000	24,238,000	.....
1891-1892	291,940	25,527,000	.....
1892-1893	361,672	27,169,876	.....
1893-1894	553,978	30,185,611	.....
1894-1895	545,287	27,628,981	.....

EXHIBIT OF COINAGE OF GOLD, SILVER, AND COPPER, IN THE REPUBLIC OF MEXICO, FROM THE 1ST OF JULY, 1873, TO THE 30TH OF JUNE, 1897—Continued.

Years.	Gold.	Silver.	Copper.
1895-1896	$565,786	$22,634,788	.....
1896-1897	453,474	19,296,009	.....
Total	12,014,554	576,877,699	$203,296

SUMMARY.—Totals: Gold, $12,014,554; silver, $576,877,699; copper, $203,296. Grand total, $589,095,549.

EXHIBIT OF THE COINAGE OF MEXICO FROM THE ESTABLISHMENT OF THE MINTS IN 1537 TO THE END OF THE FISCAL YEAR OF 1897.

Period.	Gold.	Silver.	Copper.	Total.
COLONIAL EPOCH.				
Unmilled coin, from 1537 to 1731	$8,497,950	$752,067,456	$200,000	$760,765,406
Pillar coin 1732 to 1771	19,889,014	441,629,211	.....	461,518,225
Bust coin, 1772 to 1821	40,391,447	888,563,989	342,893	929,298,329
	68,778,411	2,082,260,656	542,893	2,151,581,960
INDEPENDENCE.				
Iturbide's imperial bust, from 1822 to 1823	557,392	18,575,569	.....	19,132,961
Republic eagle, 1824 to 30th June, 1873	45,040,628	740,246,485	5,235,177	790,522,290
	45,598,020	758,822,054	5,235,177	809,655,251
REPUBLIC.				
Eagle coin, from 1st July, 1873, to 30th of June, 1897	12,014,554	576,877,699	203,296	589,095,549

SUMMARY.—Colonial epoch, from 1537 to 1821, $2,151,581,960; Independence, from 1822 to 1873, $809,655,251; Republic, from 1873 to 1897, $589,095,549. Total, $3,550,332,760.

JNO. J. VALENTINE, *President.*

XVIII.—HIGHEST, LOWEST, AND AVERAGE PRICE OF BAR SILVER IN LONDON PER OUNCE BRITISH STANDARD (0.925), SINCE 1833, AND THE EQUIVALENT IN UNITED STATES GOLD COIN OF AN OUNCE 1,000 FINE, TAKEN AT THE AVERAGE PRICE.

Calendar years.	Lowest quotation.	Highest quotation.	Average quotation.	Value of a fine ounce at average quotation.	Calendar years.	Lowest quotation.	Highest quotation.	Average quotation.	Value of a fine ounce at average quotation.
	d.	*d.*	*d.*	*Dollars.*		*d.*	*d.*	*d.*	*Dollars.*
1833	58¾	59⅞	59 3/16	1.297	1866	60⅝	62¼	61½	1.339
1834	59¾	60¾	59 15/16	1.313	1867	60⅜	61¼	60 9/16	1.328
1835	59¼	60	59 11/16	1.308	1868	60½	61½	60½	1.326
1836	59⅝	60⅜	60	1.315	1869	60	61	60 7/16	1.325
1837	59	60⅝	59 9/16	1.305	1870	60¼	60¾	60 9/16	1.328
1838	59½	60½	59½	1.304	1871	60 3/16	61	60½	1.326
1839	60	60⅝	60⅜	1.323	1872	59¼	61½	60 9/16	1.322
1840	60½	60¾	60⅜	1.323	1873	57⅞	59 15/16	59¼	1.298
1841	59¾	60⅜	60 1/16	1.316	1874	57¼	59½	58 9/16	1.278
1842	59¼	60	59 7/16	1.303	1875	55½	57⅝	56⅞	1.246
1843	59	59⅝	59 3/16	1.297	1876	46¾	58½	52¾	1.156
1844	59¼	59¾	59½	1.304	1877	53¼	58¼	54 13/16	1.201
1845	58⅞	59⅞	59¼	1.298	1878	49½	55¼	52 9/16	1.152
1846	59	60½	59 9/16	1.300	1879	48⅞	53¾	51¼	1.123
1847	58⅞	60⅜	59 11/16	1.308	1880	51⅝	52⅞	52¼	1.145
1848	58½	60	59½	1.304	1881	50⅞	52⅞	51 15/16	1.138
1849	59½	60	59¾	1.309	1882	50	52⅜	51 13/16	1.136
1850	59½	61½	61 1/16	1.316	1883	50	51 3/16	50⅝	1.110
1851	60	61⅝	61	1.337	1884	49½	51⅜	50¾	1.113
1852	59⅞	61⅞	60½	1.326	1885	46⅞	50	48 9/16	1.0645
1853	60⅝	61⅞	61½	1.348	1886	42	47	45⅜	.9946
1854	60⅞	61⅞	61½	1.348	1887	43¼	47½	44⅝	.97823
1855	60	61⅝	61 9/16	1.344	1888	41⅝	44 9/16	42⅞	.93974
1856	60½	62¼	61 9/16	1.344	1889	42	44⅜	41 11/16	.93512
1857	61	62⅜	61¾	1.353	1890	43⅝	54⅝	47¾	1.04633
1858	60¾	61⅞	61 9/16	1.344	1891	43½	48⅜	45 1/16	.98782
1859	61¾	62¾	62 1/16	1.360	1892	37⅞	43¾	39¾	.87106
1860	61¼	62⅜	61 11/16	1.352	1893	30½	38¾	35 9/16	.78031
1861	60½	62⅜	60 13/16	1.333	1894	27	31⅜	28⅞	.63479
1862	61	62½	61 7/16	1.346	1895	27 3/16	31⅜	29⅞	.65406
1863	61	61⅝	61⅜	1.345	1896	29¾	31 15/16	30⅜	.67437
1864	60⅝	62½	61⅜	1.345	1897	23⅝	29 13/16	27 9/16	.60449
1865	60½	61⅝	61 1/16	1.338					

XIX.—Commercial Ratio of Silver to Gold each Year since 1687.

[Note.—From 1687 to 1832 the ratios are taken from Dr. A. Soetbeer; from 1833 to 1878 from Pixley and Abell's tables; and from 1879 to 1896 from daily cablegrams from London to the Bureau of the Mint.]

Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.
1687....	14.94	1723...	15.20	1758...	14.85	1793...	15.00	1828...	15.78	1863...	15.37
1688...	14.94	1724...	15.11	1759...	14.15	1794...	15.37	1829...	15.78	1864...	15.37
1689....	15.02	1725...	15.11	1760...	14.14	1795...	15.55	1830...	15.82	1865...	15.44
1690....	15.02	1726...	15.15	1761...	14.54	1796...	15.65	1831...	15.72	1866...	15.43
1691....	14.98	1727...	15.24	1762...	15.27	1797...	15.41	1832...	15.73	1867...	15.57
1692....	14.92	1728...	15.11	1763...	14.99	1798...	15.59	1833...	15.93	1868...	15.59
1693....	14.83	1729...	14.92	1764...	14.70	1799...	15.74	1834...	15.73	1869...	15.60
1694....	14.87	1730...	14.81	1765...	14.83	1800...	15.68	1835...	15.80	1870...	15.57
1695....	15.02	1731...	14.94	1766...	14.80	1801...	15.46	1836...	15.72	1871...	15.57
1696....	15.00	1732...	15.09	1767...	14.85	1802...	15.26	1837...	15.83	1872...	15.63
1697....	15.20	1733...	15.18	1768...	14.80	1803...	15.41	1838...	15.85	1873...	15.92
1698....	15.07	1734...	15.39	1769...	14.72	1804...	15.41	1839...	15.62	1874...	16.17
1699....	14.94	1735...	15.41	1770...	14.62	1805...	15.79	1840...	15.62	1875...	16.59
1700....	14.81	1736...	15.18	1771...	14.66	1806...	15.52	1841...	15.70	1876...	17.88
1701....	15.07	1737...	15.02	1772...	14.52	1807...	15.43	1842...	15.87	1877...	17.22
1702....	15.52	1738...	14.91	1773...	14.62	1808...	16.08	1843...	15.93	1878...	17.94
1703....	15.17	1739...	14.91	1774...	14.62	1809...	15.96	1844...	15.85	1879...	18.40
1704....	15.22	1740...	14.94	1775...	14.72	1810...	15.77	1845...	15.92	1880...	18.05
1705....	15.11	1741...	14.92	1776...	14.55	1811...	15.53	1846...	15.90	1881...	18.16
1706....	15.27	1742...	14.85	1777...	14.54	1812...	16.11	1847...	15.80	1882...	18.19
1707....	15.44	1743...	14.85	1778...	14.68	1813...	16.25	1848...	15.85	1883...	18.64
1708....	15.41	1744...	14.87	1779...	14.80	1814...	15.04	1849...	15.78	1884...	18.57
1709....	15.31	1745...	14.98	1780...	14.72	1815...	15.26	1850...	15.70	1885...	19.41
1710....	15.22	1746...	15.13	1781...	14.78	1816...	15.28	1851...	15.46	1886...	20.78
1711....	15.29	1747...	15.26	1782...	14.42	1817...	15.11	1852...	15.59	1887...	21.13
1712....	15.31	1748...	15.11	1783...	14.48	1818...	15.35	1853...	15.33	1888...	21.99
1713....	15.24	1749...	14.80	1784...	14.70	1819...	15.33	1854...	15.33	1889...	22.10
1714....	15.13	1750...	14.55	1785...	14.92	1820...	15.62	1855...	15.38	1890...	19.76
1715....	15.11	1751...	14.39	1786...	14.96	1821...	15.95	1856...	15.38	1891...	20.92
1716....	15.09	1752...	14.54	1787...	14.92	1822...	15.80	1857...	15.27	1892...	23.72
1717....	15.13	1753...	14.54	1788...	14.65	1823...	15.84	1858...	15.38	1893...	26.49
1718....	15.11	1754...	14.48	1789...	14.75	1824...	15.82	1859...	15.19	1894...	32.56
1719....	15.09	1755...	14.68	1790.	15.04	1825 .	15.70	1860...	15.29	1895...	31.60
1720....	15.04	1756...	14.94	1791...	15.05	1826..	15.76	1861...	15.50	1896...	30.66
1721....	15.05	1757...	14.87	1792...	15.17	1827...	15.74	1862...	15.35	1897...	34.20
1722....	15.17										

XX.—Imports into the United States of Gold and Silver Ore, Bullion, and

Customs districts and ports.	GOLD.								Total.
	Contained in—			Gold ore.	Bullion.		Coin.		
	Copper regulus.	Base bullion.	Silver-lead ore.		Ounces.	Value.	United States.	Foreign	
Arizona	.....	$167	$60,533	$536,082	45,456	$909,102	.....	.....	$1,505,884
Corpus Christi	.....	41,992	.....	.....	25,941	543,822	$113,126	.....	698 940
Paso del Norte	.....	.....	250,189	.....	29,880	597,601	.....	.....	847,790
Saluria	.....	228,505	.....	.....	1,750	28,321	9,894	.....	266,720
San Diego	.....	.....	.....	25,324	3,598	58,908	.....	.....	84,232
Galveston	.....	33,243	.....	.....	.....	.....	2,220	.....	35,463
Brazos Santiago	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....
North and South Dakota	.....	.....	.....	40	.....	.....	.....	.....	40
Detroit	.....	.....	.....	.....	91	1,660	.....	.....	1,660
Niagara	.....	.....	.....	.....	4,951	88,304	1,500	.....	89,804
Champlain	.....	.....	.....	.....	.....	.....	501,831	$267,501	769,332
Minnesota	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City	$120,069	.....	297	.....	.....	.....	.....	.....	120,366
Montana and Idaho	.....	.....	461	.....	.....	.....	.....	.....	461
Puget Sound	.....	.....	2,959,960	.....	.....	.....	.....	.....	2,959,960
Omaha	.....	.....	1,105	.....	.....	.....	.....	.....	1,105
Philadelphia	.....	.....	.....	.....	.....	.....	.....	10,716	10,716
Bangor	.....	.....	.....	.....	13,948	261,759	15,600	3,100	280,459
Boston and Charlestown	.....	.....	.....	.....	4,114	82,210	.....	.....	82,210
New Orleans	.....	.....	.....	.....	a 12,742	216,178	.....	.....	216,178
Mobile	.....	.....	.....	.....	359	6,088	2,171	.....	8,259
San Francisco	.....	.....	207,563	21,521	79,629	1,680,878	71,798	9,855,336	11,837,096
New York	.....	709,840	.....	16,971	56,032	1,139,536	8,482,352	3,890,546	14,239,245
Huron	.....	.....	.....	85	.....	.....	.....	.....	85
Alaska	.....	.....	.....	50	.....	.....	.....	.....	50
Total	120,069	1,013,747	3,480,108	600,073	278,491	5,614,367	9,200,492	14,027,199	34,056,055

a Includes 1,062 ounces = $19,409 bars made by the United States Mint.

COIN, BY CUSTOMS DISTRICTS, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

SILVER.								Total.
Contained in—			Silver ore.	Bullion.		Coin.		
Copper regulus.	Base bullion.	Silver lead ore.		Ounces.	Value.	United States.	Foreign.	
.....	$2,867	$830,793	$148,992	409,431	$243,433	.....	.....	$1,226,085
.....	303,307	15,775	.....	159,640	92,633	.....	$449,825	861,540
.....	.....	2,963,327	.....	913,088	538,156	.....	5,411,769	8,913,252
.....	488,779	4,835	.....	9,322	5,363	.....	687,724	1,186,701
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	95,489	.....	.....	.....	.....	.....	.....	95,489
.....	.....	.....	.....	.....	.....	.....	14,014	14,014
.....	404,817	.....	.....	.....	.....	.....	.....	404,817
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	90	25	.....	547	250	$2,720	.....	3,085
.....	.....	.....	.....	.....	.....	19,225	.....	19,225
.....	.....	.....	.....	.....	.....	45,411	3,977	49,388
.....	.....	6,320	.....	.....	.....	.....	.....	6,320
$252,180	.....	30,673	.....	.....	.....	.....	.....	282,853
.....	.....	112,838	.....	.....	.....	.....	.....	112,838
.....	.....	2,273,245	.....	.....	.....	.....	8,831	2,282,076
.....	.....	813,422	.....	.....	.....	.....	.....	813,422
.....	.....	.....	310	.....	.....	.....	4,521	4,831
.....	.....	.....	.....	.....	.....	13,801	621	14,422
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	750	347,297	348,047
.....	.....	.....	.....	.....	.....	1,639	21,516	23,155
.....	.....	504,557	.....	2,489,817	1,580,928	.....	593,361	2,678,846
.....	11,822,424	167,413	283,306	733,223	385,564	85,504	1,095,846	13,840,057
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
252,180	13,117,773	7,723,223	432,608	4,715,068	2,846,327	169,050	8,639,302	33,180,463

XXI.—IMPORTS INTO THE UNITED STATES OF GOLD AND SILVER ORE, BULLION,

Countries from which imported.	GOLD.							Total.
	Contained in—		Gold ore.	Bullion.		Coin.		
	Base bullion.	Silver-lead ore.		Ounces.	Value.	United States.	Foreign.	
Azores, Madeira, etc						$25,576		$25,576
France						2,500,000	$10	2,500,010
Germany							10	10
United Kingdom	$5,099		$73	6,851	$141,129	4,461,934	896,351	5,504,586
Italy				24,213	498,790			498,790
British Honduras				383	8,260	596		8,856
Dominion of Canada:								
Nova Scotia, New Brunswick			618	18,062	343,969	15,600	3,558	363,745
Ontario, Quebec, etc			525	5,042	89,964	503,331	267,501	861,321
British Columbia	a 237,219	$2,961,823	50	15,267	327,198			3,526,290
Northwest Territory			50					50
Central American States:								
Costa Rica			4,100	735	14,550		390	19,040
Honduras	31,060		11,676	7,510	149,615		1,636	193,987
Nicaragua				c 14,215	244,585	36,949	1,600	283,134
San Salvador						3,150		3,150
Guatemala				5	100	1,714		1,814
Mexico	860,438	518,285	582,083	127,553	2,588,619	178,042	41,498	4,768,965
British West Indies				24	486	61,495	27,077	89,658
Danish West Indies				108	2,158	255,780	150,118	408,056
Dutch West Indies				35	706	18,801	600	20,107
French West Indies						738	876	1,614
Santo Domingo				93	1,830	14,580	670	17,080
Haiti				235	4,704	418,610		423,314
Cuba				131	2,665	381,593	2,415,913	2,800,171
Porto Rico				8	150	13,008	18,316	31,474
South American States:								
Colombia			104	13,262	265,623	19,524	17,953	303,204
Venezuela				225	4,470	256,173	326,736	587,379
Peru				444	8,879			8,879
Chile						1,285		1,285
Ecuador				158	3,145	413	450	4,008
Brazil				59	1,183			1,183
British Guiana				118	2,350			2,350
Dutch Guiana				195	3,897			3,897
Australasia			794	43,560	905,342	180	9,855,336	10,761,652
China								
Gibraltar								
French Oceanica						770		770
Tonga, Samoa, etc						650		650
Hawaii						30,000		30,000
Total	1,133,816	3,480,108	600,073	278,491	5,614,367	9,200,492	14,027,199	34,056,055

a Includes $120,069, value of gold contained in copper regulus.
b Includes $252,180, value of silver contained in copper regulus.

AND COIN, BY COUNTRIES, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

SILVER.							Total.
Contained in—		Silver ore.	Bullion.		Coin.		
Base bullion.	Silver lead ore.		Ounces.	Value.	United States.	Foreign.	
.....	.....	.....	.....	.....	$573	$248	$821
.....	.....	.....	.....	.....	2,173	133	2,306
.....	.....	.....	.....	.....	3,126	151	3,277
$521	.....	.....	.....	.....	2,092	65,425	68,038
.....	.....	.....	.....	.....	500	.....	500
.....	.....	.....	.....	.....	824	280,651	281,475
.....	$1,780	.....	.....	.....	14,093	623	16,496
90	25	.....	547	$250	67,356	3,977	71,698
b 290,198	3,199,954	.....	.....	.....	.....	788	3,490,940
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	3,497	3,497
76,709	21,029	$31,376	663,540	349,355	.....	72,550	551,019
.....	.....	.....	.....	.....	2,013	70,727	72,740
.....	100	4,000	.....	.....	44,000	163,437	211,537
.....	.....	.....	.....	.....	10	43,430	43,440
12,902,004	4,355,407	167,219	4,047,442	2,494,770	2,751	7,196,155	27,118,306
.....	.....	.....	.....	.....	6,302	16,229	22,531
.....	.....	.....	.....	.....	3,264	7,812	11,076
.....	.....	.....	.....	.....	2,775	17,545	20,320
.....	.....	.....	.....	.....	4	103	107
.....	.....	.....	512	267	1,088	483,954	485,309
.....	.....	.....	127	68	1,790	9,912	11,770
.....	.....	.....	1,710	935	2,802	3,265	7,002
.....	.....	.....	.....	.....	1,177	976	2,153
.....	6,427	2,373	841	501	9,742	176,710	195,753
.....	.....	.....	16	10	27	373	410
100,431	75,796	209,008	.....	.....	.....	18,116	403,351
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	201	100	275	406	781
.....	.....	.....	132	71	.....	.....	71
.....	.....	.....	.....	.....	.....	.....	.....
.....	62,705	18,632	.....	.....	.....	.....	81,337
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	457	457
.....	.....	.....	.....	.....	293	.....	293
.....	.....	.....	.....	.....	.....	1,460	1,460
.....	.....	.....	.....	.....	.....	192	192
.....	.....	.....	.....	.....	.....	.....	.....
13,369,953	7,723,223	432,608	4,715,068	2,846,327	169,050	8,639,302	33,180,463

c Includes 1,062 ounces = $19,409 value of bars made by the United States Mint.

XXII.—Exports of Domestic Gold and Silver Ore, Bullion, and Coin to ended December

Customs districts.	GOLD.								
	Base bullion.	Ore.	Total.	United States Mint or assay office bars.		Other bars.		Coin.	Total.
	Value.	Value.	Value.	Ounces.	Value.	Ounces.	Value.	Value	Value.
Bangor	.....	$190	$190	.....	.....	1	$21	$75,005	$75,216
Champlain	.....	.....	.....	.....	.....	.....	.....	2,174,540	2,174,540
Niagara	.....	.....	.....	.....	.....	4,369	77,144	152,657	229,801
Puget Sound	.....	.....	.....	.....	.....	.....	.....	140,835	140,835
Alaska	.....	.....	.....	.....	.....	53	1,055	.....	1,055
Boston and Charlestown	.....	.....	.....	.....	.....	.....	.....	8,100	8,100
Vermont	.....	.....	.....	.....	.....	4	85	.....	85
Buffalo Creek	.....	.....	.....	.....	.....	28	578	.....	578
Baltimore	$173	.....	173	.....	.....	.....	.....	500	673
Mobile	.....	.....	.....	.....	.....	.....	.....	5,000	5,000
Saluria	.....	.....	.....	.....	.....	.....	.....	7,978	7,978
Paso del Norte	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	88	1,885	1,278,513	1,280,398
New York	101,846	.....	101,846	567,682	$11,636,684	26,343	541,841	17,354,942	29,635,313
Total	102,019	190	102,209	567,682	11,636,684	30,886	622,609	21,198,070	33,559,572

CERTAIN COUNTRIES FROM THE UNITED STATES DURING THE CALENDAR YEAR 31, 1898.

SILVER.								
Base bullion.	Ore.	Total.	United States Mint or assay office bars.		Other bars.		Coin.	Total.
Value.	Value.	Value.	Value.	Ounces.	Ounces.	Value.	Value.	Value.
.....	.....	.....	.....	.....	346	$208	$3	$211
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	64,573	38,223	3,347	41,570
$635	.....	$635	.....	.....	.....	.....	18,936	19,571
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	$556	337	1,163	742	.....	1,079
1,334	.....	1,334	.....	.....	.....	.....	.....	1,334
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	540	370	.....	370
.....	$600	600	.....	.....	.....	.....	.....	600
.....	.....	.....	790,158	512,540	8,335,247	4,914,882	87,700	5,515,122
307,084	.....	307,084	90,553	55,700	74,406,918	45,153,545	4,917	45,521,246
309,053	600	309,653	881,267	568,577	82,808,787	50,107,970	114,903	51,101,103

XXIII.—Exports of Domestic Gold and Silver Ore, Bullion, and Coin to ended Decem

Customs districts.	GOLD.								
	Base bullion.	Ore.	Total.	United States Mint or assay office bars.		Other bars.		Coin.	Total.
	Value.	Value.	Value.	Ounces.	Value.	Ounces.	Value.	Value.	Value.
Nova Scotia, New Brunswick, etc	.....	$190	$190	.....	.....	1	$21	$75,005	$75,216
Miquelon	.....	.....	.....	.....	.....	.....	.....	8,100	8,100
Quebec, Ontario, etc	.....	.....	.....	.....	.....	4,401	77,807	2,327,197	2,405,004
British Columbia	.....	.....	.....	.....	.....	53	1,055	140,835	141,890
Mexico	.....	.....	.....	.....	.....	.....	.....	13,678	13,678
Germany	$64,533	.....	64,533	47,790	$979,660	.....	.....	11,210,000	12,254,193
England	36,226	.....	36,226	.....	.....	16,409	337,387	500,000	873,613
France	850	.....	850	519,892	10,657,024	9,934	204,454	4,000,000	14,862,328
Netherlands	410	.....	410	.....	.....	.....	.....	750,000	750,410
British West Indies	.....	.....	.....	.....	.....	.....	.....	11,785	11,785
Dutch West Indies	.....	.....	.....	.....	.....	.....	.....	1,970	1,970
Haiti	.....	.....	.....	.....	.....	.....	.....	605,439	605,439
Santo Domingo	.....	.....	.....	.....	.....	.....	.....	98,960	98,960
Colombia	.....	.....	.....	.....	.....	.....	.....	19,900	19,900
Ecuador	.....	.....	.....	.....	.....	.....	.....	5,000	5,000
Uruguay	.....	.....	.....	.....	.....	.....	.....	3,170	3,170
Venezuela	.....	.....	.....	.....	.....	.....	.....	98,050	98,050
Guatemala	.....	.....	.....	.....	.....	.....	.....	43,465	43,465
San Salvador	.....	.....	.....	.....	.....	.....	.....	51,338	51,338
Costa Rica	.....	.....	.....	.....	.....	.....	.....	4,200	4,200
Nicaragua	.....	.....	.....	.....	.....	.....	.....	5,625	5,625
British Honduras	.....	.....	.....	.....	.....	.....	.....	5,000	5,000
Honduras	.....	.....	.....	.....	.....	.....	.....	440	440
China	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hongkong	.....	.....	.....	.....	.....	88	1,885	61,021	62,906
Japan	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hawaiian Islands	.....	.....	.....	.....	.....	.....	.....	1,155,140	1,155,140
Oceanica	.....	.....	.....	.....	.....	.....	.....	2,752	2,752
British East Indies	.....	.....	.....	.....	.....	.....	.....	.....	.....
British Africa	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	102,019	190	102,209	567,682	11,636,684	30,886	622,609	21,198,070	33,559,572

CERTAIN COUNTRIES FROM THE UNITED STATES DURING THE CALENDAR YEAR BER 31, 1897.

SILVER.								
Base bullion.	Ore.	Total.	United States Mint or assay office bars.		Other bars.		Coin.	Total.
Value.	Value.	Value.	Ounces.	Value.	Ounces.	Value.	Value.	Value.
.....	.....	.....	.....	.....	346	$208	$3	$211
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	556	$337	65,736	38,965	3,347	42,649
$635	.....	$635	.....	.....	.....	.....	18,936	19,571
.....	$600	600	.....	.....	540	370	.....	970
3,008	.....	3,008	.....	.....	.....	.....	.....	3,008
293,210	.....	293,210	90,553	55,700	72,883,599	44,213,170	.....	44,562,080
.....	.....	.....	.....	.....	1,522,914	940,000	.....	940,000
12,200	.....	12,200	.....	.....	.....	.....	.....	12,200
.....	.....	.....	.....	.....	.....	.....	4,867	4,867
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	50	50
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	1,482,371	877,290	.....	877,290
.....	.....	.....	12,650	8,100	3,131,349	1,850,624	.....	1,858,724
.....	.....	.....	777,508	504,440	1,146,335	714,980	.....	1,219,420
.....	.....	.....	.....	.....	.....	.....	87,700	87,700
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	2,575,192	1,471,988	.....	1,471,988
.....	.....	.....	.....	.....	405	375	.....	375
309,053	600	309,653	881,267	568,577	82,808,787	50,107,970	114,903	51,101,103

XXIV.—EXPORTS OF FOREIGN GOLD AND SILVER FROM THE UNITED

Customs districts.	GOLD.					
	Base bullion.	Ore.	Bullion.		Coin.	Total.
	Value.	Value.	Ounces.	Value.	Value.	Value.
New York			62	$1,000	$654,127	$655,127
San Francisco						
Bangor		$10				10
Niagara			644	12,877	1,475	14.352
Champlain					33,740	33,740
Detroit					3,000	3,000
Saluria						
San Diego						
Brazos Santiago						
Corpus Christi						
Galveston	$33,243					33,243
Baltimore					600	600
Philadelphia						
Mobile						
Total	33,243	10	706	13,877	692,942	740,072

XXV.—EXPORTS OF FOREIGN GOLD AND SILVER FROM THE UNITED STATES TO

Countries.	GOLD.					
	Base bullion.	Ore.	Bullion.		Coin.	Total.
	Value.	Value.	Ounces.	Value.	Value.	Value.
France			62	$1,000	$521,995	$522,995
Germany					70,000	70,000
United Kingdom	$33,243					33,243
Dominion of Canada:						
Quebec, Ontario, etc			644	12,877	38,215	51,092
Nova Scotia, New Brunswick, etc		$10				10
Central American States:						
Honduras					607	607
Guatemala					264	264
Cuba						
Haiti						
Santo Domingo					1,100	1,100
Mexico						
British West Indies						
Dutch West Indies					75	75
Brazil						
Bolivia						
Colombia					600	600
Ecuador					4,900	4,900
Peru						
Venezuela					55,186	55,186
Hongkong						
China						
British East Indies						
French Oceanica						
San Salvador						
Total	33,243	10	706	13,877	692,942	740,072

STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

SILVER.					
Base bullion.	Ore.	Bullion.		Coin.	Total.
Value.	Value.	Ounces.	Value.	Value.	Value.
.....	.....	.....	.....	$1,737,022	$1,737,022
.....	.....	.....	.....	5,641,586	5,641,586
.....	.....	.....	.....	2,333	2,333
.....	.....	11,012	$6,583	3,900	10,483
.....	.....	.....	.....	77,878	77,878
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	73,828	73,828
.....	.....	.....	.....	1,150	1,150
.....	.....	.....	.....	3,048	3,048
.....	.....	.....	.....	1,030	1,030
$95,489	.....	.....	.....	.....	95,489
.....	.....	.....	.....	1,622	1,622
.....	.....	.....	.....	1,063	1,063
.....	.....	.....	.....	9,126	9,126
95,489	.....	11,012	6,583	7,553,586	7,655,658

CERTAIN COUNTRIES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1897.

SILVER.					
Base bullion.	Ore.	Bullion.		Coin.	Total.
Value.	Value.	Ounces.	Value.	Value.	Value.
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	$6,070	$6,070
$95,489	.....	.....	.....	1,130,830	1,226,319
.....	.....	11,012	$6,583	81,778	88,361
.....	.....	.....	.....	2,333	2,333
.....	.....	.....	.....	21,453	21,453
.....	.....	.....	.....	200,440	200,440
.....	.....	.....	.....	900	900
.....	.....	.....	.....	960	960
.....	.....	.....	.....	310,970	310,970
.....	.....	.....	.....	84,181	84,181
.....	.....	.....	.....	12,133	12,133
.....	.....	.....	.....	450	450
.....	.....	.....	.....	24,851	24,851
.....	.....	.....	.....	10,662	10,662
.....	.....	.....	.....	24,775	24,775
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	18,835	18,835
.....	.....	.....	.....	679	679
.....	.....	.....	.....	4,809,286	4,809,286
.....	.....	.....	.....	754,510	754,510
.....	.....	.....	.....	22,000	22,000
.....	.....	.....	.....	12,490	12,490
.....	.....	.....	.....	23,000	23,000
95,489	.....	11,012	6,583	7,553,586	7,655,658

XXVI.—Recapitulation of Imports and Exports of the Precious Metals during the Calendar Year ended December 31, 1897.

Description.	Imports.	Exports.	Excess.	
			Imports.	Exports.
GOLD.				
Contained in—				
Copper regulus	$120,069		$120,069	
Lead bullion	1,013,747	$102,019	911,728	
Lead bullion, foreign		33,243		$33,243
Silver-lead ores	3,480,108		3,480,108	
Ore:				
Domestic		190		190
Foreign	600,073	10	600,063	
Bars, United States Mint or assay office	19,409	11,636,684		11,617,275
Bullion:				
Foreign	5,594,958	13,877	5,581,081	
Domestic		622,609		622,609
Coin:				
Foreign	9,200,492	21,198,070		11,997,578
Domestic	14,027,199	692,942	13,334,257	
Total	34,056,055	34,299,644	24,027,306	24,270,895
Excess of exports				243,589
SILVER.				
Contained in—				
Copper regulus	252,180		252,180	
Lead bullion	13,117,773	309,053	12,808,720	
Lead bullion, foreign		95,489		95,489
Silver-lead ores	7,723,223		7,723,223	
Ore	432,608	600	432,008	
Bullion, foreign	2,846,327	6,583	2,839,744	
Bars:				
United States Mint or assay office		568,577		568,577
Other		50,107,970		50,107,970
Coin:				
United States	169,050	114,903	54,147	
Foreign	8,639,302	7,553,586	1,085,716	
Total	33,180,463	58,756,761	25,195,738	50,772,036
Excess of exports				25,576,298

XXVII.—Coinage of Nations.

Countries.	1895.		1896.		1897.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	$59,616,358	$5,698,010	$47,053,060	$23,089,899	$76,028,485	$18,487,297
Mexico	504,193	24,832,351	565,985	21,092,397	417,176	19,608,459
Great Britain	18,547,229	5,776,584	23,402,560	6,470,352	8,654,764	4,583,688
Australasia	33,695,008	.....	34,602,786	.....	37,289,873	.....
India *a*	.....	4,044,935	.....	5,579,692	.....	25,227,996
France	20,845,337	1,544,000	21,719,880	.....	42,726,251	8,492
Germany	25,588,334	1,826,038	25,133,476	2,718,368	30,145,656	.....
Russia *b*	38,590,432	3,696,192	10,284	30,985,566	*c*170,614,861	*c*35,392,493
Austria-Hungary *d*	18,208,728	9,056,188	33,898,739	7,904,911	33,640,553	5,722,330
Eritrea	.....	.....	.....	771,800	.....	.....
Spain	.....	205,649	.....	5,386,942	2,890,407	6,724,106
Italy	.....	.....	.....	.....	147,965	307,957
Servia	.....	.....	.....	.....	.....	1,014,624
Japan	1,515,000	23,883,505	1,125,000	13,399,062	31,600,410	4,266,028
Portugal	.....	119,880	.....	1,900,800	.....	864,000
Netherlands	135,692	140,700	.....	428,130	.....	964,800
Norway	.....	80,400	.....	67,000	.....	147,400
Sweden	896,921	.....	.....	109,007	.....	535,319
Denmark	.....	.....	.....	.....	.....	135,513
Switzerland	772,000	44,390	1,544,000	1,930	1,544,000	.....
Turkey	3,420,717	414,483	50,114	7,473	920,962	440,435
Egypt	.....	.....	.....	562,770	.....	519,830
Abyssinia	.....	.....	.....	376	.....	720,133
Liberia	.....	.....	.....	12,000	.....	.....
Hongkong	.....	5,516,063	.....	7,835,617	.....	23,836,427
China	.....	8,253,340	.....	8,638,630	.....	10,636,955
Indo-China	.....	6,092,709	.....	12,542,772	.....	2,773,428
Tunis	232	347	232	347	632,500	347
Canada	.....	.....	.....	140,000	.....	65,964
Newfoundland	.....	.....	.....	98,000	.....	.....
Costa Rica	.....	.....	.....	.....	465,433	.....
Haiti	.....	730,285	.....	.....	.....	.....
Argentina	.....	.....	982,715	.....	.....	.....
Bolivia	.....	1,744,210	.....	1,508,087	.....	1,189,282
Peru	.....	4,073,270	.....	2,704,831	.....	449,807
Colombia	.....	.....	.....	.....	.....	552,480
Ecuador	.....	1,102,073	.....	169,798	.....	623,687
Chile	8,353,212	4,243,919	5,424,686	677,877	49	.....
Uruguay	.....	1,000,000	.....	.....	.....	.....
Guatemala	145	500,000	.....	.....	.....	.....
British Honduras	.....	30,000	.....	.....	.....	20,000
Santo Domingo	.....	.....	.....	.....	.....	606,071
Porto Rico	.....	8,389,222	.....	167,240	.....	.....
German East Africa	.....	.....	.....	392	.....	127,440
German New Guinea	11,900	.....	.....	.....	.....	.....
Monaco	386,000	.....	386,000	.....	.....	.....
Straits Settlements	.....	450,446	.....	453,554	.....	134,000
Congo State	.....	.....	.....	193,000	.....	.....
Morocco	.....	354,630	.....	598,655	.....	873,509
Mauritius	.....	.....	.....	.....	.....	50,000
Ceylon	.....	440,000	.....	.....	.....	150,000
Siam	.....	2,589,823	.....	3,322,752	.....	.....
Total	231,087,438	126,873,642	195,899,517	159,540,027	437,719,345	167,760,297

a Rupee calculated at coining rate, $0,4737.
b Silver ruble calculated at coining rate, $0.7718.
c Ruble calculated at coining rate, $0.514555. Ukase January 3, 1897.
d Florin calculated at coining rate, $0,4[illegible] under the coinage act of August 2, 1[illegible]

XXVIII.—World's Production of Gold and

[Kilogram of gold, $664.60; kilogram of silver,

	Countries.	1895.			
		Gold.		Silver.	
		Kilos.	*Dollars.*	*Kilos.*	*Dollars.*
1	United States	70,132	46,610,000	1,733,662	72,051,000
2	Australasia	67,406	44,798,300	389,102	16,171,100
3	Mexico	9,028	*a* 6,000,000	1,461,008	60,719,500
	European countries:				
4	Russia	43,476	28,894,400	12,495	519,300
5	Germany	*b* 3,345	2,223,100	181,000	7,522,400
6	Austria-Hungary	2,993	1,989,000	67,952	2,824,100
7	Sweden	79	52,500	1,187	49,300
8	Norway	.....	.....	6,082	252,800
9	Italy	188	125,300	5,714	237,500
10	Spain	.....	.....	109,804	4,563,500
11	Greece	.....	.....	*f* 35,436	1,472,700
12	Turkey	8	5,300	8,118	337,400
13	France	.....	.....	17,619	732,200
14	Great Britain	161	107,000	8,722	362,500
15	Dominion of Canada	2,875	1,910,900	55,241	2,295,800
	South American countries:				
16	Argentina	474	315,000	10,210	424,300
17	Colombia	*e* 4,353	2,892,800	*e* 52,511	2,182,400
18	Bolivia	101	*a* 67,000	*f* 684,418	28,444,400
19	Ecuador	200	132,900	*e* 240	10,000
20	Chile	2,118	1,407,600	156,542	6,505,900
21	Brazil	1,446	961,200	.....	.....
22	Venezuela	*f* 1,368	909,500	.....	.....
23	Guiana (British)	3,330	2,213,100	.....	.....
24	Guiana (Dutch)	791	525,600	.....	.....
25	Guiana (French)	2,809	1,865,900	.....	.....
26	Peru	96	63,800	98,401	4,089,500
27	Uruguay	41	27,200	.....	.....
28	Central American States	*f* 708	470,500	48,123	*g* 2,000,000
29	Japan	*h* 778	517,100	*h* 67,355	2,799,300
30	China	5,298	*a* 3,521,000	.....	.....
31	Africa	67,301	44,728,400	.....	.....
32	India (British)	7,006	4,656,200	.....	.....
33	Korea	1,052	699,200	.....	.....
34	Borneo	111	73,800	.....	.....
	Total	299,072	198,763,600	5,210,942	216,566,900

a Estimate of the Bureau of the Mint.

b Gold separated from silver in Germany, whose gold contents do not figure in the statistics of any other country.

c Estimated the same as officially communicated for 1896.

d Estimated the same as officially communicated for 1895.

SILVER FOR CALENDAR YEARS 1895, 1896, AND 1897.

$41.56, coining rate in United States silver dollars.]

1896.				1897.				
Gold.		Silver.		Gold.		Silver.		
Kilos.	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	
79,880	53,088,000	1,830,347	76,069,200	86,312	57,363,000	1,675,582	69,637,200	1
67,984	45,181,900	471,629	19,600,900	83,786	55,684,200	496,252	20,624,200	2
12,536	*a* 8,331,700	1,420,057	59,017,600	14,198	*a* 9,436,300	1,676,925	69,693,000	3
32,404	21,535,800	10,457	434,600	34,977	23,245,700	8,856	368,000	4
b 1,714	1,139,100	183,252	7,616,000	*b* 2,066	1,373,100	171,047	7,108,700	5
3,239	2,152,700	57,986	2,409,900	3,364	2,235,600	61,297	2,547,500	6
114	76,100	554	23,000	127	84,400	645	26,800	7
.....	.....	5,046	209,700	.....	.....	*c* 5,046	209,700	8
211	140,200	27,245	1,132,300	292	194,400	22,933	953,100	9
.....	.....	179,795	7,472,300	.....	.....	*c* 179,795	7,472,300	10
.....	.....	32,000	1,329,900	.....	.....	*c* 32,000	1,329,900	11
11	7,300	7,007	291,200	*c* 11	7,300	*c* 7,007	291,200	12
.....	.....	16,353	679,600	.....	.....	*c* 16,353	679,600	13
37	24,600	8,169	339,500	53	35,100	7,221	300,100	14
4,228	2,810,200	99,718	4,144,300	9,069	6,027,100	172,923	7,186,700	15
474	*d* 315,000	10,210	*d* 424,300	207	137,600	11,930	495,800	16
4,514	*a* 3,000,000	*e* 52,511	2,182,400	4,514	*a* 3,000,000	*e* 52,511	2,182,400	17
1,128	*a* 750,000	*a* 466,649	19,393,900	1,128	*a* 750,000	*a* 466,649	19,393,900	18
200	132,900	*e* 240	10,000	*c* 200	132,900	*e* 240	10,000	19
2,118	*d* 1,407,600	156,542	*d* 6,505,900	1,397	928,600	200,366	8,327,200	20
1,506	1,001,100	.....	.....	1,812	1,204,200	.....	.....	21
1,427	948,500	.....	.....	*c* 1,427	948,500	.....	.....	22
3,330	*d* 2,213,100	.....	.....	3,453	2,294,600	.....	.....	23
725	481,800	.....	.....	741	492,200	.....	.....	24
3,171	2,107,400	.....	.....	2,313	1,537,500	.....	.....	25
175	116,600	70,122	2,914,300	945	628,000	304,400	12,650,900	26
50	33,600	.....	.....	58	38,500	.....	.....	27
f 708	470,500	48,123	*g* 2,000,000	*f* 708	470,500	48,123	*g* 2,000,000	28
i 1,073	713,300	*i* 78,009	3,242,100	*i* 1,073	713,300	*i* 78,009	3,242,100	29
4,550	*a* 3,024,000	.....	.....	3,324	*a* 2,209,100	.....	.....	30
67,080	44,581,100	.....	.....	87,732	58,306,600	.....	.....	31
9,224	6,130,500	.....	.....	10,905	7,247,500	.....	.....	32
1,086	721,800	.....	.....	1,103	733,100	.....	.....	33
69	45,900	.....	.....	69	45,900	.....	.....	34
304,966	202,682,300	5,232,021	217,442,900	357,364	237,504,800	5,696,110	236,730,300	

e Estimated the same as officially communicated for 1893.
f Estimated the same as officially communicated for 1894.
g Estimated the same as officially communicated for 1887.
h Product of Imperial mines, 1895; private mines, 1893.
i Product of Imperial mines, 1896; private mines, 1894.

XXIX.—World's Production of Gold and

[Fine ounce of gold, $20.671834+; fine ounce of silver,

	Countries.	1895.			
		Gold.		Silver.	
		Ozs. fine.	*Dollars.*	*Ozs. fine.*	*Dollars.*
1	United States	2,254,760	46,610,000	55,726,945	72,051,000
2	Australasia	2,167,118	44,798,300	12,507,335	16,171,100
3	Mexico	290,250	*a* 6,000,000	46,962,738	60,719,300
	European countries:				
4	Russia	1,397,767	28,894,400	401,646	519,300
5	Germany	*b* 107,542	2,223,100	5,818,106	7,522,400
6	Austria-Hungary	96,218	1,989,000	2,184,265	2,824,100
7	Sweden	2,540	52,500	38,130	49,300
8	Norway	.....	.....	195,525	252,800
9	Italy	6,063	125,300	183,655	237,500
10	Spain	.....	.....	3,529,582	4,563,500
11	Greece	.....	.....	*f* 1,139,041	1,472,700
12	Turkey	256	5,300	260,958	337,400
13	France	.....	.....	566,346	733,200
14	Great Britain	5,176	107,000	280,371	362,500
15	Dominion of Canada	92,440	1,910,900	1,775,658	2,295,800
	South American countries:				
16	Argentina	15,238	315,000	328,170	424,300
17	Colombia	*e* 139,939	2,892,800	*e* 1,687,950	2,182,400
18	Bolivia	3,241	*a* 67,000	*f* 21,999,966	28,444,400
19	Ecuador	6,429	132,900	*e* 7,734	10,000
20	Chile	68,092	1,407,600	5,031,907	6,505,900
21	Brazil	46,498	961,200	.....	.....
22	Venezuela	*f* 43,997	909,500	.....	.....
23	Guiana (British)	107,059	2,213,100	.....	.....
24	Guiana (Dutch)	25,426	525,600	.....	.....
25	Guiana (French)	90,263	1,865,900	.....	.....
26	Peru	3,086	63,800	3,162,973	4,089,500
27	Uruguay	1,316	27,200	.....	.....
28	Central American States	*f* 22,760	470,500	1,546,875	*g* 2,000,000
29	Japan	*h* 25,015	517,100	*h* 2,165,084	2,799,300
30	China	170,328	*a* 3,521,000	.....	.....
31	Africa	2,163,736	44,728,400	.....	.....
32	India (British)	225,244	4,656,200	.....	.....
33	Korea	33,824	699,200	.....	.....
34	Borneo	3,569	73,800	.....	.....
	Total	9,615,190	198,763,600	167,500,960	216,566,900

a Estimate of the Bureau of the Mint.

b Gold separated from silver in Germany, whose gold contents do not figure in the statistics of any other country.

c Estimated the same as officially communicated for 1896.

d Estimated the same as officially communicated for 1895.

SILVER FOR THE CALENDAR YEARS 1895, 1896, AND 1897.

$1.292929+, coining rate in United States silver dollars.]

1896.				1897.				
Gold.		Silver.		Gold.		Silver.		
Ozs. fine.	*Dollars.*	*Ozs. fine.*	*Dollars.*	*Ozs. fine.*	*Dollars.*	*Ozs. fine.*	*Dollars.*	
2,568,132	53,088,000	58,834,800	76,069,200	2,774,935	57,363,000	53,800,000	69,637,200	1
2,185,676	45,181,900	15,160,077	19,600,900	2,693,723	55,684,200	15,951,546	20,624,200	2
403,046	*a* 8,331,700	45,646,424	59,017,600	456,481	*a* 9,436,300	53,903,180	69,693,000	3
1,041,794	21,535,800	336,127	434,600	1,124,511	23,245,700	284,625	368,000	4
b 55,104	1,139,100	5,890,500	7,616,000	*b* 66,424	1,373,100	5,498,135	7,108,700	5
104,137	2,152,700	1,863,921	2,409,900	108,147	2,235,600	1,970,332	2,547,500	6
3,681	76,100	17,822	23,000	4,083	84,400	20,728	26,800	7
.....	.....	162,198	209,700	.....	.....	*c* 162,198	209,700	8
6,782	140,200	875,763	1,132,300	9,404	194,400	737,163	953,100	9
.....	.....	5,779,357	7,472,300	.....	.....	*c* 5,779,357	7,472,300	10
.....	.....	1,028,609	1,329,900	.....	.....	*c* 1,028,609	1,329,900	11
353	7,300	225,225	291,200	*c* 353	7,300	*c* 225,225	291,200	12
.....	.....	525,628	679,600	.....	.....	*c* 525,628	679,600	13
1,188	24,600	262,567	339,500	1,698	35,100	232,108	300,100	14
135,943	2,810,200	3,205,343	4,144,300	291,561	6,027,100	5,558,446	7,186,700	15
15,238	*d* 315,000	328,176	*d* 424,300	6,656	137,600	383,470	495,800	16
145,125	*a* 3,000,000	*e* 1,687,950	2,182,400	145,125	*a* 3,000,000	*e* 1,687,950	2,182,400	17
36,281	*a* 750,000	*a* 15,000,000	19,393,900	36,281	*a* 750,000	*a* 15,000,000	19,393,900	18
6,429	132,900	*e* 7,734	10,000	*c* 6,429	132,900	*e* 7,734	10,000	19
68,092	*d* 1,407,600	5,031,907	*d* 6,505,900	44,921	928,600	6,440,569	8,327,200	20
48,428	1,001,100	.....	.....	58,253	1,204,200	.....	.....	21
45,882	948,500	.....	.....	*c* 45,882	948,500	.....	.....	22
107,059	*d* 2,213,100	.....	.....	111,001	2,294,600	.....	.....	23
23,309	481,800	.....	.....	23,810	492,200	.....	.....	24
101,945	2,107,400	.....	.....	74,376	1,537,500	.....	.....	25
5,639	116,600	2,254,021	2,914,300	30,380	628,000	9,784,680	12,650,900	26
1,625	33,600	.....	.....	1,862	38,500	.....	.....	27
f 22,760	470,500	1,546,875	*g* 2,000,000	*f* 22,760	470,500	1,546,875	*g* 2,000,000	28
i 34,506	713,300	*i* 2,507,532	3,242,100	*i* 34,506	713,300	*i* 2,507,532	3,242,100	29
146,285	*a* 3,024,000	.....	.....	106,865	*a* 2,209,100	.....	.....	30
2,156,611	44,581,100	.....	.....	2,820,582	58,306,600	.....	.....	31
293,563	6,130,500	.....	.....	350,598	7,247,500	.....	.....	32
34,915	721,800	.....	.....	35,464	733,100	.....	.....	33
2,220	45,900	.....	.....	*f* 2,220	45,900	.....	.....	34
9,804,748	202,682,300	168,178,550	217,442,900	11,489,291	237,504,800	183,096,090	236,730,300	

e Estimated the same as officially communicated for 1893.
f Estimated the same as officially communicated for 1894.
g Estimated the same as officially communicated for 1887.
h Product of Imperial mines, 1895; private mines, 1893.
i Product of Imperial mines, 1896; private mines, 1894.

XXX.—PRODUCTION OF GOLD AND SILVER IN

[From 1493 to 1885 is from a table of averages for certain periods, compiled by Dr. Adolph Soetbeer.

	Period.	GOLD.			
		Annual average for period.		Total for period.	
		Fine ounces.	Value.	Fine ounces.	Value.
1	1493-1520	186,470	$3,855,000	5,221,160	$107,931,000
2	1521-1544	230,194	4,759,000	5,524,656	114,205,000
3	1545-1560	273,596	5,656,000	4,377,544	90,492,000
4	1561-1580	219,906	4,546,000	4,398,120	90,917,000
5	1581-1600	237,267	4,905,000	4,745,340	98,095,000
6	1601-1620	273,918	5,662,000	5,478,360	113,248,000
7	1621-1640	266,845	5,516,000	5,336,900	110,324,000
8	1641-1660	281,955	5,828,000	5,639,110	116,571,000
9	1661-1680	297,709	6,154,000	5,954,180	123,084,000
10	1681-1700	346,095	7,154,000	6,921,895	143,088,000
11	1701-1720	412,163	8,520,000	8,243,260	170,403,000
12	1721-1740	613,422	12,681,000	12,268,440	253,611,000
13	1741-1760	791,211	16,356,000	15,824,230	327,116,000
14	1761-1780	665,666	13,761,000	13,313,315	275,211,000
15	1781-1800	571,948	11,823,000	11,438,970	236,464,000
16	1801-1810	571,563	11,815,000	5,715,627	118,152,000
17	1811-1820	367,957	7,606,000	3,679,568	76,063,000
18	1821-1830	457,044	9,448,000	4,570,444	94,479,000
19	1831-1840	652,291	13,484,000	6,522,913	134,841,000
20	1841-1850	1,760,502	36,393,000	17,605,018	363,928,000
21	1851-1855	6,410,324	132,513,000	32,051,621	662,566,000
22	1856-1860	6,486,262	134,083,000	32,431,312	670,415,000
23	1861-1865	5,949,582	122,989,000	29,747,913	614,944,000
24	1866-1870	6,270,086	129,614,000	31,350,430	648,071,000
25	1871-1875	5,591,014	115,577,000	27,955,068	577,883,000
26	1876-1880	5,543,110	114,586,000	27,715,550	572,931,000
27	1881-1885	4,794,755	99,116,000	23,973,773	495,582,000
28	1886-1890	5,461,282	112,895,000	27,306,411	564,474,000
29	1891-1895	7,882,565	162,947,000	39,412,823	814,736,000
30	1896	9,804,748	202,682,300	9,804,748	202,682,300
31	1897	11,489,291	237,504,800	11,489,291	237,504,800
	Total			446,017,990	9,220,012,100

THE WORLD SINCE THE DISCOVERY OF AMERICA.

For the years 1886 to 1897 the production is the annual estimate of the Bureau of the Mint.]

SILVER.				PERCENTAGE OF PRODUCTION.				
Annual average for period.		Total for period.		By weight.		By value.		
Fine ounces.	Coining value	Fine ounces.	Coining value.	Gold.	Silver.	Gold.	Silver.	
1,511,050	$1,954,000	42,309,400	$54,703,000	11	89	66.4	33.6	1
2,899,930	3,740,000	69,598,320	89,986,000	7.4	92.6	55.9	44.1	2
10,017,940	12,952,000	160,287,040	207,240,000	2.7	97.3	30.4	69.6	3
9,628,925	12,450,000	192,578,500	248,990,000	2.2	97.8	26.7	73.3	4
13,467,635	17,413,000	269,352,700	348,254,000	1.7	98.3	22	78	5
13,596,235	17,579,000	271,924,700	351,579,000	2	98	24.4	75.6	6
12,654,240	16,361,000	253,084,800	327,221,000	2.1	97.9	25.2	74.8	7
11,776,545	15,226,000	235,530,900	304,525,000	2.3	97.7	27.7	72.3	8
10,834,550	14,008,000	216,691,000	280,166,000	2.7	97.3	30.5	69.5	9
10,992,085	14,212,000	219,841,700	284,240,000	3.1	96.9	33.5	66.5	10
11,432,540	14,781,000	228,650,800	295,629,000	3.5	96.5	36.6	63.4	11
13,863,080	17,924,000	277,261,600	358,480,000	4.2	95.8	41.4	58.6	12
17,140,612	22,162,000	342,812,235	443,232,000	4.4	95.6	42.5	57.5	13
20,985,591	27,133,000	419,711,820	542,658,000	3.1	96.9	33.7	66.3	14
28,261,779	36,540,000	565,235,580	730,810,000	2	98	24.4	75.6	15
28,746,922	37,168,000	287,469,225	371,677,000	1.9	98.1	24.1	75.9	16
17,385,755	22,479,000	173,857,555	224,780,000	2.1	97.9	25.3	74.7	17
14,807,004	19,144,000	148,070,040	191,444,000	3	97	33	67	18
19,175,867	24,703,000	191,758,675	247,930,000	3.3	96.7	35.2	64.8	19
25,090,342	32,440,000	250,903,422	324,400,000	6.6	93.4	52.9	47.1	20
28,488,597	36,824,000	142,442,986	184,169,000	18.4	81.6	78.3	21.7	21
29,095,428	37,618,000	145,477,142	188,092,000	18.2	81.8	78.1	21.9	22
35,401,972	45,772,000	177,009,862	228,861,000	14.4	85.6	72.9	27.1	23
43,051,583	55,663,000	215,257,914	278,313,000	12.7	87.3	70	30	24
63,317,014	81,864,000	316,585,069	409,322,000	8.1	91.9	58.5	41.5	25
78,775,602	101,851,000	393,878,009	509,256,000	6.6	93.4	53	47	26
92,003,944	118,955,000	460,019,722	594,778,000	5	95	45.5	54.5	27
108,911,431	140,815,000	544,557,155	704,074,000	4.8	95.2	44.5	55.5	28
157,581,331	203,742,000	787,906,656	1,018,708,000	4.8	95.2	44.4	55.6	29
168,178,550	217,442,900	168,178,550	217,442,900	5.5	94.5	48.2	51.8	30
183,096,090	236,730,300	183,096,090	236,730,300	5.9	94.1	50	50	31
.....	.....	8,351,339,167	10,797,685,200	5	95	46	54	

XXXI.—Coinage of the Mints of the United States from their Organization, 1792, to December 31, 1897.

Denomination.	Pieces.	Value.
GOLD.		
Double eagles	67,843,440	$1,356,868,800.00
Eagles	28,105,056	281,050,560.00
Half eagles	45,478,617	227,393,085.00
Three-dollar pieces (coinage discontinued under act of Sept. 26, 1890)	539,792	1,619,376.00
Quarter eagles	11,527,627	28,819,067.50
Dollars (coinage discontinued under act of Sept. 26, 1890)	19,499,337	19,499,337.00
Total gold	172,993,869	1,915,250,225.50
SILVER.		
Dollars (coinage discontinued, act of Feb. 12, 1873, and resumed under act of Feb. 28, 1878)	463,849,360	a 463,849,360.00
Trade dollars	35,965,924	35,965,924.00
Half dollars	271,287,642	135,643,821.00
Half dollars, Columbian souvenir	5,002,105	2,501,052.50
Quarter dollars	217,358,816	54,339,704.00
Quarter dollars, Columbian souvenir	40,023	10,005.75
Twenty-cent pieces (coinage discontinued, act of May 2, 1878)	1,355,000	271,000.00
Dimes	304,416,519	30,441,651.90
Half dimes (coinage discontinued, act Feb. 12, 1873)	97,604,388	4,880,219.40
Three-cent pieces (coinage discontinued, act Feb. 12, 1873)	42,736,240	1,282,087.20
Total silver	1,439,616,017	729,184,825.75
MINOR.		
Five-cent pieces, nickel	310,326,149	15,516,307.45
Three-cent pieces, nickel (coinage discontinued, act Sept. 26, 1890)	31,378,316	941,349.48
Two-cent pieces, bronze (coinage discontinued, act Feb. 12, 1873)	45,601,000	912,020.00
One-cent pieces, copper (coinage discontinued, act Feb. 21, 1857)	156,288,744	1,562,887.44
One-cent pieces, nickel (coinage discontinued, act Apr. 22, 1864)	200,772,000	2,007,720.00
One-cent pieces, bronze	874,257,085	8,742,570.85
Half-cent pieces, copper (coinage discontinued, act Feb. 21, 1857)	7,985,222	39,926.11
Total minor	1,626,608,516	29,722,781.33
Total coinage	3,239,218,402	2,674,157,832.58

a Silver-dollar coinage under act of—

April 2, 1792			$8,031,238
Bland-Allison Act, February 28, 1878		$378,166,793	
Sherman Act, July 14, 1890, to October 31, 1893	$36,087,285		
From repeal of purchasing clause, November 1, 1893, of Sherman Act, to December 31, 1897	36,485,572		
		72,572,857	
March 3, 1891, recoinage of trade dollars		5,078,472	
			455,818,122
Total			463,849,360

XXXII.—COINAGE OF FRACTIONAL AND SUBSIDIARY SILVER COINS, BY ACTS AND DENOMINATIONS, FROM 1792 TO 1897.

Denomination.	1792 to 1853.	1853 to Feb. 12, 1873.	Feb. 12, 1873, to Dec. 31, 1897.	Total silver.
Dollars	$2,506,890.00	$5,524,348.00	$455,818,122.00	$463,849,360.00
Trade dollars			35,965,924.00	35,965,924.00
Total dollars	2,506,890.00	5,524,348.00	491,784,046.00	499,815,284.00
Half dollars	66,280,640.50	32,666,832.50	36,696,348.00	135,643,821.00
Half dollars, Columbian			2,501,052.50	2,501,052.50
Quarter dollars	3,994,040.50	17,879,790.50	32,465,873.00	54,339,704.00
Quarter dollars, Columbian			10,005.75	10,005.75
Twenty-cent pieces			271,000.00	271,000.00
Dimes	3,890,230.10	4,908,520.00	21,642,901.80	30,441,651.90
Half dimes	1,825,126.40	3,055,093.00		4,880,219.40
Three-cent pieces	744,927.00	537,160.20		1,282,087.20
Total subsidiary	76,734,964.50	59,047,396.20	93,587,181.05	229,369,541.75
Total silver	79,241,854.50	64,571,744.20	585,371,227.05	729,184,825.75

Fractional silver coinage, 1792 to 1853	$76,734,964.50
Subsidiary silver coinage, 1853 to February 12, 1873	59,047,396.20
Subsidiary silver coinage, February 12, 1873, to December 31, 1897	93,587,181.05
Total	229,369,541.75

XXXIII.—Coinage of the Mints of the United States

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793 to 1795	.....	$27,950	$43,535	.....	.....	.....
1796	.....	60,800	16,995	.....	$165.00	.....
1797	.....	91,770	32,030	.....	4,390.00	.....
1798	.....	79,740	124,335	.....	1,535.00	.....
1799	.....	174,830	37,255	.....	1,200.00	.....
1800	.....	259,650	58,110	.....	.....	.....
1801	.....	292,540	130,030	.....	.....	.....
1802	.....	150,900	265,880	.....	6,530.00	.....
1803	.....	89,790	167,530	.....	1,057.50	.....
1804	.....	97,950	152,375	.....	8,317.50	.....
1805	.....	.....	165,915	.....	4,452.50	.....
1806	.....	.....	320,465	.....	4,040.00	.....
1807	.....	.....	420,465	.....	17,030.00	.....
1808	.....	.....	277,890	.....	6,775.00	.....
1809	.....	.....	169,375	.....	.....	.....
1810	.....	.....	501,435	.....	.....	.....
1811	.....	.....	497,905	.....	.....	.....
1812	.....	.....	290,435	.....	.....	.....
1813	.....	.....	477,140	.....	.....	.....
1814	.....	.....	77,270	.....	.....	.....
1815	.....	.....	3,175	.....	.....	.....
1816	.....	.....	.....	.....	.....	.....
1817	.....	.....	.....	.....	.....	.....
1818	.....	.....	242,940	.....	.....	.....
1819	.....	.....	258,615	.....	.....	.....
1820	.....	.....	1,319,030	.....	.....	.....
1821	.....	.....	173,205	.....	16,120.00	.....
1822	.....	.....	88,980	.....	.....	.....
1823	.....	.....	72,425	.....	.....	.....
1824	.....	.....	86,700	.....	6,500.00	.....
1825	.....	.....	145,300	.....	11,085.00	.....
1826	.....	.....	90,345	.....	1,900.00	.....
1827	.....	.....	124,565	.....	7,000.00	.....
1828	.....	.....	140,145	.....	.....	.....
1829	.....	.....	287,210	.....	8,507.50	.....
1830	.....	.....	631,755	.....	11,350.00	.....
1831	.....	.....	702,970	.....	11,300.00	.....
1832	.....	.....	787,435	.....	11,000.00	.....
1833	.....	.....	968,150	.....	10,400.00	.....
1834	.....	.....	3,660,845	.....	293,425.00	.....
1835	.....	.....	1,857,670	.....	328,505.00	.....
1836	.....	.....	2,765,735	.....	1,369,965.00	.....
1837	.....	.....	1,035,605	.....	112,700.00	.....
1838	.....	72,000	1,432,940	.....	117,575.00	.....
1839	.....	382,480	590,715	.....	67,552.50	.....
1840	.....	473,390	686,910	.....	47,147.50	.....
1841	.....	631,310	79,165	.....	.....	.....
1842	.....	815,070	137,890	.....	7,057.50	.....
1843	.....	754,620	3,056,025	.....	251,365.00	.....
Carried forward	.....	4,454,780	25,652,815	.....	2,745,947.50	.....

Note.—Not susceptible of exact statement by years of actual date of coin, the registry of annual having been invariably completed within the year of the date of coin, as now required.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS.

its organization, 1793, to December 31, 1897.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$204,791	$161,572.00	.....	.....	.....	$4,320.80	.....
.....	72,920	.....	$1,473.50	.....	$2,213.50	511.50	.....
.....	7,776	1,959.00	63.00	.....	2,526.10	2,226.35	.....
.....	327,536	.....	.....	.....	2,755.00	.....	.....
.....	423,515	.....	.....	.....	.....	.....	.....
.....	220,920	.....	.....	.....	2,176.00	1,200.00	.....
.....	54,454	15,144.50	.....	.....	3,464.00	1,695.50	.....
.....	41,650	14,945.00	.....	.....	1,097.50	650.50	.....
.....	66,064	15,857.50	.....	.....	3,304.00	1,892.50	.....
.....	19,570	78,259.50	1,684.50	.....	826.50	.....	.....
.....	321	105,861.00	30,348.50	.....	12,078.00	780.00	.....
.....	.....	419,788.00	51,531.00	.....	.....	.....	.....
.....	.....	525,788.00	55,160.75	.....	16,500.00	.....	.....
.....	.....	684,300.00	.....	.....	.....	.....	.....
.....	.....	702,905.00	.....	.....	4,471.00	.....	.....
.....	.....	638,138.00	.....	.....	635.50	.....	.....
.....	.....	601,822.00	.....	.....	6,518.00	.....	.....
.....	.....	814,029.50	.....	.....	.....	.....	.....
.....	.....	620,951.50	.....	.....	.....	.....	.....
.....	.....	519,537.50	.....	.....	42,150.00	.....	.....
.....	.....	.....	17,308.00	.....	.....	.....	.....
.....	.....	23,575.00	5,000.75	.....	.....	.....	.....
.....	.....	607,783.50	.....	.....	.....	.....	.....
.....	.....	980,161.00	90,293.50	.....	.....	.....	.....
.....	.....	1,104,000.00	36,000.00	.....	.....	.....	.....
.....	.....	375,561.00	31,861.00	.....	94,258.70	.....	.....
.....	.....	652,898.50	54,212.75	.....	118,651.20	.....	.....
.....	.....	779,786.50	16,020.00	.....	10,000.00	.....	.....
.....	.....	847,100.00	4,450.00	.....	44,000.00	.....	.....
.....	.....	1,752,477.00	.....	.....	.....	.....	.....
.....	.....	1,471,583.00	42,000.00	.....	51,000.00	.....	.....
.....	.....	2,002,090.00	.....	.....	.....	.....	.....
.....	.....	2,746,700.00	1,000.00	.....	121,500.00	.....	.....
.....	.....	1,537,600.00	25,500.00	.....	12,500.00	.....	.....
.....	.....	1,856,078.00	.....	.....	77,000.00	61,500.00	.....
.....	.....	2,382,400.00	.....	.....	51,000.00	62,000.00	.....
.....	.....	2,936,830.00	99,500.00	.....	77,135.00	62,135.00	.....
.....	.....	2,398,500.00	80,000.00	.....	52,250.00	48,250.00	.....
.....	.....	2,603,000.00	39,000.00	.....	48,500.00	68,500.00	.....
.....	.....	3,206,002.00	71,500.00	.....	63,500.00	74,000.00	.....
.....	.....	2,676,003.00	488,000.00	.....	141,000.00	138,000.00	.....
.....	1,000	3,273,100.00	118,000.00	.....	119,000.00	95,000.00	.....
.....	.....	1,814,910.00	63,100.00	.....	104,200.00	113,800.00	.....
.....	.....	1,773,000.00	208,000.00	.....	199,250.00	112,750.00	.....
.....	300	1,667,280.00	122,786.50	.....	105,311.50	53,457.50	.....
.....	61,005	717,504.00	47,031.75	.....	135,858.00	67,204.25	.....
.....	173,000	155,000.00	30,000.00	.....	162,250.00	57,500.00	.....
.....	184,618	1,006,382.00	22,000.00	.....	188,750.00	40,750.00	.....
.....	165,100	1,922,000.00	161,400.00	.....	137,000.00	58,250.00	.....
.....	2,024,540	51,190,162.50	2,014,225.50	.....	2,214,629.50	1,126,373.90	.....

coinage being of coin delivered by coiners of mints within the given year, and these deliveries

COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	.....	$4, 454, 780	$25, 652, 815	.....	$2, 745, 947. 50	.....
1844	.....	63, 610	1, 701. 650	.....	16, 960. 00	.....
1845	.....	261, 530	2, 085, 495	.....	227, 027. 50	.....
1846	.....	200, 950	1, 979, 710	.....	53, 905. 00	.....
1847	.....	8, 622. 580	4, 579, 905	.....	74, 535. 00	.....
1848	.....	1, 454. 840	1, 303, 875	.....	22, 215. 00	.....
1849	.....	6, 536, 180	665. 350	.....	58, 235. 00	$668, 567
1850	$23, 405, 220	2, 914, 510	322, 455	.....	632, 307. 50	481, 953
1851	41, 743, 100	1. 763, 280	1, 887, 525	.....	3, 431, 870. 00	3, 317, 671
1852	41, 060, 520	2, 631, 060	2, 869, 505	.....	2, 829, 202. 50	2, 045, 351
1853	25. 226, 520	2, 012, 530	1, 528, 850	.....	3, 511, 670. 00	4, 076, 051
1854	15. 157, 980	542, 500	803. 375	$415, 854	1, 490, 645. 00	1, 639, 445
1855	7, 293, 320	1, 217, 010	585, 490	151, 665	588, 700. 00	758, 269
1856	6, 597, 560	604, 900	989. 950	78, 030	960, 600. 00	1, 762, 936
1857	8, 787, 500	166. 060	490, 940	62, 673	535, 325. 00	774, 769
1858	4, 234, 280	25, 210	75, 680	6, 399	118, 442. 50	117, 995
1859	871, 940	160, 930	84, 070	46, 914	98, 610. 00	168, 244
1860	11. 553, 400	117, 830	99. 125	21, 465	56, 687. 50	36, 668
1861	59. 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 205. 00	527, 499
1862	1, 842, 660	109, 950	22, 325	17, 355	280, 882. 50	1. 326, 865
1863	2, 855, 800	12, 480	12, 360	15, 117	75. 00	6, 250
1864	4, 085, 700	35, 800	21, 100	8, 040	7, 185. 00	5, 950
1865	7, 024, 000	40, 050	6, 475	3, 495	3, 862. 50	3, 725
1866	13, 975, 500	37, 800	33, 600	12, 090	7, 775. 00	7, 180
1867	5, 021, 300	31, 400	34, 600	7, 950	8, 125. 00	5, 250
1868	1, 972, 000	106, 550	28, 625	14, 625	9, 062. 50	10, 525
1869	3, 503, 100	18, 550	8, 925	7, 575	10, 862. 50	5, 925
1870	3, 103, 700	25, 350	20, 175	10, 605	11, 387. 50	6, 335
1871	1, 603, 000	17, 800	16, 150	3, 990	13, 375. 00	3, 930
1872	5, 037, 600	16, 500	8, 450	6, 090	7, 575. 00	3, 530
1873	34, 196, 500	8, 250	562, 525	75	445, 062. 50	125, 125
1874	7, 336, 000	531, 600	17, 540	125, 460	9, 850. 00	198, 820
1875	5, 914, 800	1, 200	1, 100	60	1, 050. 00	420
1876	11. 678, 100	7, 320	7, 385	135	10, 552. 50	3, 245
1877	7, 953, 400	8, 170	5, 760	4, 464	4, 130. 00	3, 920
1878	10, 872, 900	738, 000	658, 700	246, 972	715, 650. 00	3, 020
1879	4, 152, 600	3, 847, 700	1, 509, 750	9, 090	222, 475, 00	3, 030
1880	1, 029. 120	16, 448, 760	15, 832, 180	3, 108	7, 490. 00	1, 636
1881	45, 200	38. 772, 600	28, 544, 000	1, 650	1, 700. 00	7, 660
1882	12, 600	23, 244, 800	12, 572, 800	4, 620	10, 100. 00	5, 040
1883	800	2, 087, 400	1, 167. 200	2, 820	4, 900. 00	10, 840
1884	1, 420	769, 050	955, 240	3, 318	4, 982. 50	6, 206
1885	16, 560	2, 535, 270	3, 007, 530	2, 730	2, 217. 50	12, 205
1886	22, 120	2, 361, 600	1, 942, 160	3, 426	10, 220. 00	6, 016
1887	2, 420	536. 800	435	18, 480	15, 705. 00	8, 543
1888	4, 525, 320	1, 329, 960	91, 480	15, 873	40, 245. 00	16, 080
1889	882, 220	44, 850	37, 825	7, 287	44, 120. 00	30, 729
1890	1, 519, 900	580, 430	21, 640	.....	22, 032. 50	.....
1891	28, 840	918. 680	307, 065	.....	27, 600. 00	.....
1892	90, 460	7, 975, 520	3, 767, 860	.....	6, 362. 50	.....
1893	6, 886. 780	18, 408, 950	7, 640, 985	.....	75, 265. 00	.....
1894	27, 379, 800	24, 707, 780	4, 789, 775	.....	10, 305. 00	.....
1895	22, 293, 120	5, 678, 260	6, 729, 680	.....	15, 297. 50	.....
1896	15, 853, 260	763, 480	295, 315	.....	48, 005. 00	.....
1897	27, 665, 220	10, 001, 590	4. 339, 415	.....	74, 760. 00	.....
Total	485, 844, 220	197, 642, 870	145, 923, 645	1, 357, 716	22, 895, 115. 00	18, 223, 438

a Includes Columbian souvenir half dollars, 1892, $475,000.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1897.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$2,024,540	$51,190,162.50	$2,014,225.50	.....	$2,214,629.50	$1,126,873.90	.....
.....	20,000	883,000.00	105,300.00	.....	7,250.00	21,500.00	.....
.....	24,500	294,500.00	230,500.00	.....	175,500.00	78,200.00	.....
.....	110,600	1,105,000.00	127,500.00	.....	3,130.00	1,350.00	.....
.....	140,750	578,000.00	183,500.00	.....	24,500.00	63,700.00	.....
.....	15,000	290,000.00	36,500.00	.....	45,150.00	33,400.00	.....
.....	62,600	626,000.00	85,000.00	.....	83,900.00	65,450.00	.....
.....	7,500	113,500.00	47,700.00	.....	193,150.00	47,750.00	.....
.....	1,300	100,375.00	40,000.00	.....	102,650.00	39,050.00	$163,422.00
.....	1,100	38,565.00	44,265.00	.....	153,550.00	50,025.00	559,905.00
.....	46,110	1,766,354.00	3,813,555.00	.....	1,217,301.00	667,251.00	342,000.00
.....	33,140	1,491,000.00	3,095,000.00	.....	447,000.00	287,000.00	20,130.00
.....	26,000	379,750.00	714,250.00	.....	207,500.00	87,500.00	4,170.00
.....	63,500	469,000.00	1,816,000.00	.....	578,000.00	244,000.00	43,740.00
.....	94,000	994,000.00	2,411,000.00	.....	558,000.00	364,000.00	31,260.00
.....	.....	2,113,000.00	1,842,000.00	.....	154,000.00	175,000.00	48,120.00
.....	256,500	374,000.00	336,000.00	.....	43,000.00	17,000.00	10,950.00
.....	218,930	151,850.00	201,350.00	.....	60,700.00	39,950.00	8,610.00
.....	78,500	1,444,200.00	1,213,650.00	.....	192,400.00	164,050.00	14,940.00
.....	12,090	126,175.00	233,137.50	.....	84,755.00	74,627.50	10,906.50
.....	27,660	251,830.00	48,015.00	.....	1,446.00	923.00	643.80
.....	31,170	189,785.00	23,517.50	.....	3,907.00	23.50	14.10
.....	47,000	255,950.00	14,825.00	.....	1,050.00	675.00	255.00
.....	49,625	372,812.50	4,381.25	.....	872.50	536.25	681.75
.....	60,325	212,162.50	5,156.25	.....	662.50	431.25	138.75
.....	182,700	189,100.00	7,500.00	.....	46,625.00	4,295.00	123.00
.....	424,300	397,950.00	4,150.00	.....	25,660.00	10,430.00	153.00
.....	433,000	300,450.00	21,850.00	.....	47,150.00	26,830.00	120.00
.....	1,115,760	582,680.00	42,808.00	.....	75,361.00	74,443.00	127.80
.....	1,106,450	440,775.00	45,737.50	.....	239,645.00	147,397.50	58.50
$397,500	293,600	1,308,750.00	371,075.00	.....	394,710.00	35,630.00	18.00
987,800	.....	1,180,150.00	117,975.00	.....	294,070.00	.....	.....
218,900	.....	3,013,750.00	1,073,375.00	$7,940	1,035,070.00	.....	.....
456,150	.....	4,209,575.00	4,454,287.50	3,180	1,146,115.00	.....	.....
3,039,710	.....	4,152,255.00	2,727,927.50	102	731,051.00	.....	.....
900	10,509,550	689,200.00	565,200.00	120	167,880.00	.....	.....
1,541	14,807,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	12,601,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	9,163,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	11,101,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	12,291,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	14,070,875	2,637.50	2,218.75	.....	336,638.00	.....	.....
.....	17,787,767	3,065.00	3,632.50	.....	253,342.70	.....	.....
.....	19,963,886	2,943.00	1,471.50	.....	637,757.00	.....	.....
.....	20,290,710	2,855.00	2,677.50	.....	1,128,393.90	.....	.....
.....	19,183,833	6,416.50	2,708.25	.....	549,648.70	.....	.....
.....	21,726,811	6,355.50	3,177.75	.....	738,071.10	.....	.....
.....	16,802,590	6,295.00	20,147.50	.....	991,154.10	.....	.....
.....	8,694,206	100,300.00	980,150.00	.....	1,531,060.00	.....	.....
.....	1,037,245	a942,622.50	2,059,311.25	.....	1,212,124.50	.....	.....
.....	378,792	b2,939,448.50	c1,371,203.75	.....	334,079.20	.....	.....
.....	110,972	574,486.00	858,243.00	.....	133,097.20	.....	.....
.....	12,880	917,609.00	1,110,220.00	.....	69,088.00	.....	.....
.....	9,976,762	475,381.00	968,690.50	.....	200,076.20	.....	.....
.....	2,822,731	1,240,365.50	2,035,182.75	.....	1,086,926.40	.....	.....
5,107,524	230,342,429	89,516,971.00	37,555,840.75	11,342	21,125,221.70	3,948,791.90	1,260,487.20

b Includes Columbian souvenir half dollars, 1893, $2,026,052.50.
c Includes Columbian souvenir quarter dollars, 1893, $10,005.75.

COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
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1843			
Carried forward			

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1897.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$10,660.33	$712.67	$71,485.00	$370,683.80	$11,373.00	$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723.39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,622,515.00	2,293,000.00	63,702.00	3,979,217.00
31,286.61	.....	1,040,747.50	1,949,135.50	31,286.61	3,021,169.61
24,627.00	.....	1,207,437.50	1,028,603.00	24,627.00	2,260,667.50
15,973.67	.....	710,475.00	577,750.00	15,973.67	1,304,198.67
23,833.90	.....	960,017.50	1,442,500.00	23,833.90	2,426,351.40
24,283.20	.....	4,062,010.00	2,443,750.00	24,283.20	6,530,043.20
942,417.40	37,203.56	32,853,542.50	58,569,931.40	979,620.96	92,403,094.86

COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at New Orleans from its organization, 1838, to

Calendar years.	GOLD.						SILVER.
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.
1838							
1839					$44,452.50		
1840			$152,000		65,500.00		
1841		$25,000	41,750		18,450.00		
1842		274,000	82,000		49,500.00		
1843		1,751,620	505,375		920,005.00		
1844		1,187,000	1,823,000				
1845		475,000	205,000				
1846		817,800	290,000		165,000.00		$59,000
1847		5,715,000	60,000		310,000.00		
1848		358,500					
1849		239,000				$215,000	
1850	$2,820,000	575,000			210,000.00	14,000	40,000
1851	6,300,000	2,630,000	205,000		370,000.00	290,000	
1852	3,800,000	180,000			850,000.00	140,000	
1853	1,420,000	510,000				290,000	
1854	65,000	525,000	210,000	$72,000	382,500.00		
1855	160,000	180,000	55,500			53,000	
1856	45,000	145,000	50,000		52,750.00		
1857	600,000	55,000	65,000		85,000.00		
1858	705,000	200,000					
1859	182,000	23,000					360,000
1860	132,000	111,000					515,000
1861 *a*	100,000						
1879	46,500	15,000					2,887,000
1880		92,000					5,305,000
1881		83,500					5,708,000
1882		108,200					6,090,000
1883		8,000					8,725,000
1884							9,730,000
1885							9,185,000
1886							10,710,000
1887							11,550,000
1888		213,350					12,150,000
1889							11,875,000
1890							10,701,000
1891							7,954,529
1892		286,880	50,000				2,744,000
1893		170,000	550,000				300,000
1894		1,075,000	83,000				1,723,000
1895		980,000					450,000
1896							4,900,000
1897		425,000					4,004,000
Total	16,375,500	19,433,850	4,447,625	72,000	3,023,157.50	1,004,000	127,665,529

a No coinage from 1862 to 1878, inclusive.

COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Dahlonega, Ga., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.				TOTAL VALUE.
	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	
1838	$102,915				$102,915.00
1839	94,695		$34,185.00		128,880.00
1840	114,480		8,830.00		123,310.00
1841	152,475		10,410.00		162,885.00
1842	298,040		11,607.50		309,647.50
1843	492,260		90,522.50		582,782.50
1844	444,910		43,330.00		488,240.00
1845	453,145		48,650.00		501,795.00
1846	401,470		48,257.50		449,727.50
1847	322,025		39,460.00		361,485.00
1848	237,325		34,427.50		271,752.50
1849	195,180		27,362.50	$21,588	244,130.50
1850	219,750		30,370.00	8,382	258,502.00
1851	313,550		28,160.00	9,882	351,592.00
1852	457,260		10,195.00	6,360	473,815.00
1853	448,390		7,945.00	6,583	462,918.00
1854	282,065	$3,360	4,400.00	2,935	292,760.00
1855	112,160		2,807.50	1,811	116,778.50
1856	98,930		2,185.00	1,460	102,575.00
1857	85,230		5,910.00	3,533	94,673.00
1858	76,810			3,477	80,287.00
1859	51,830		5,610.00	4,952	62,392.00
1860	73,175			1,566	74,741.00
1861	7,985				7,985.00
Total	5,536,055	3,360	494,625.00	72,529	6,106,569.00

COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at San Francisco

Calendar years.	GOLD.						SILVER.	
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.	Trade dollars.
1854	$2,829,360	$1,238,260	$1,340	.....	$615	$14,632	.....	.....
1855	17,593,500	90,000	305,000	$19,800	.....	.....	.....	.....
1856	23,795,000	680,000	525,500	103,500	177,800	24,600	.....	.....
1857	19,410,000	260,000	435,000	42,000	170,000	10,000	.....	.....
1858	16,934,200	118,000	93,000	.....	3,000	10,000	.....	.....
1859	12,728,900	70,000	66,100	.....	38,000	15,000	$20,000	.....
1860	10,899,000	50,000	106,000	21,000	89,000	13,000	.....	.....
1861	15,360,000	155,000	90,000	.....	60,000	.....	.....	.....
1862	17,083,460	125,000	47,500	.....	20,000	.....	.....	.....
1863	19,331,400	100,000	85,000	.....	27,000	.....	.....	.....
1864	15,873,200	25,000	19,440	.....	.....	.....	.....	.....
1865	20,850,000	167,000	138,060	.....	58,440	.....	.....	.....
1866	16,845,000	200,000	219,600	.....	97,400	.....	.....	.....
1867	18,415,000	90,000	145,000	.....	70,000	.....	.....	.....
1868	16,750,000	135,000	260,000	.....	85,000	.....	.....	.....
1869	13,735,000	64,300	155,000	.....	73,750	.....	.....	.....
1870	19,640,000	80,000	85,000	.....	40,000	3,000	.....	.....
1871	18,560,000	165,000	125,000	.....	55,000	.....	.....	.....
1872	15,600,000	173,000	182,000	.....	45,000	.....	9,000	.....
1873	20,812,000	120,000	155,000	.....	67,500	.....	700	$703,000
1874	24,280,000	100,000	80,000	.....	.....	.....	.....	2,549,000
1875	24,600,000	.....	45,000	.....	29,000	.....	.....	4,487,000
1876	31,940,000	50,000	20,000	.....	12,500	.....	.....	5,227,000
1877	34,700,000	170,000	133,500	.....	88,500	.....	.....	9,519,000
1878	34,780,000	261,000	723,500	.....	445,000	.....	9,774,000	4,162,000
1879	24,476,000	2,240,000	2,131,000	.....	108,750	.....	9,110,000	.....
1880	16,720,000	5,062,500	6,744,500	.....	.....	.....	8,900,000	.....
1881	14,540,000	9,700,000	4,845,000	.....	.....	.....	12,760,000	.....
1882	22,500,000	1,320,000	4,845,000	.....	.....	.....	9,250,000	.....
1883	23,780,000	380,000	416,000	.....	.....	.....	6,250,000	.....
1884	18,320,000	1,242,500	885,000	.....	.....	.....	3,200,000	.....
1885	13,670,000	2,280,000	6,057,500	.....	.....	.....	1,497,000	.....
1886	.....	8,260,000	16,340,000	.....	.....	.....	750,000	.....
1887	5,660,000	8,170,000	9,560,000	.....	.....	.....	1,771,000	.....
1888	17,192,000	6,487,000	1,469,500	.....	.....	.....	657,000	.....
1889	15,494,000	4,254,000	.....	.....	.....	.....	700,000	.....
1890	16,055,000	.....	.....	.....	.....	.....	8,230,373	.....
1891	25,762,500	.....	.....	.....	.....	.....	5,296,000	.....
1892	18,603,000	1,155,000	1,492,000	.....	.....	.....	1,200,000	.....
1893	19,923,500	1,413,500	1,120,000	.....	.....	.....	100,000	.....
1894	20,971,000	250,000	279,500	.....	.....	.....	1,260,000	.....
1895	22,870,000	490,000	560,000	.....	.....	.....	400,000	.....
1896	28,078,500	1,237,500	777,000	.....	.....	.....	5,000,000	.....
1897	29,405,000	2,347,500	1,770,000	.....	.....	.....	5,825,000	.....
Total	837,365,520	60,976,060	63,532,540	186,300	1,861,255	90,232	91,960,073	26,647,000

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1854, to December 31, 1897.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Gold.	Silver.	
.....	.....	.....	.....	.....	$4,084,207	.....	$4,084,207.00
$64,975.00	$99,100.00	.....	.....	.....	18,008,300	$164,075.00	18,172,375.00
105,500.00	71,500.00	.....	$7,000.00	.....	25,306,400	184,000.00	25,490,400.00
79,000.00	20,500.00	.....	.....	.....	20,327,000	99,500.00	20,426,500.00
238,000.00	30,250.00	.....	6,000.00	.....	17,158,200	274,250.00	17,432,450.00
283,000.00	20,000.00	.....	6,000.00	.....	12,918,000	329,000.00	13,247,000.00
236,000.00	14,000.00	.....	14,000.00	.....	11,178,000	264,000.00	11,442,000.00
469,750.00	24,000.00	.....	17,250.00	.....	15,665,000	511,000.00	16,176,000.00
676,000.00	16,750.00	.....	18,075.00	.....	17,275,960	710,825.00	17,986,785.00
458,000.00	.....	.....	15,750.00	$5,000	19,543,400	478,750.00	20,022,150.00
329,000.00	5,000.00	.....	23,000.00	4,500	15,917,640	361,500.00	16,279,140.00
337,500.00	10,250.00	.....	17,500.00	6,000	21,213,500	371,250.00	21,584,750.00
527,000.00	7,000.00	.....	13,500.00	6,000	17,362,000	553,500.00	17,915,500.00
598,000.00	12,000.00	.....	14,000.00	6,000	18,720,000	630,000.00	19,350,000.00
580,000.00	24,000.00	.....	26,000.00	14,000	17,230,000	644,000.00	17,874,000.00
328,000.00	19,000.00	.....	45,000.00	11,500	14,028,050	403,500.00	14,431,550.00
502,000.00	.....	.....	5,000.00	.....	19,848,000	507,000.00	20,355,000.00
1,089,000.00	7,725.00	.....	32,000.00	8,050	18,905,000	1,136,775.00	20,041,775.00
290,000.00	20,750.00	.....	19,000.00	41,850	16,000,000	380,600.00	16,380,600.00
116,500.00	39,000.00	.....	45,500.00	16,200	21,154,500	920,900.00	22,075,400.00
197,000.00	98,000.00	.....	24,000.00	.....	24,460,000	2,868,000.00	27,328,000.00
1,600,000.00	170,000.00	$231,000	907,000.00	.....	24,674,000	7,395,000.00	32,069,000.00
2,264,000.00	2,149,000.00	.....	1,042,000.00	.....	32,022,500	10,682,000.00	42,704,500.00
2,678,000.00	2,249,000.00	.....	234,000.00	.....	35,092,000	14,680,000.00	49,772,000.00
6,000.00	35,000.00	.....	.....	.....	36,209,500	13,977,000.00	50,186,500.00
.....	.....	.....	.....	.....	28,955,750	9,110,000.00	38,065,750.00
.....	.....	.....	.....	.....	28,527,000	8,900,000.00	37,427,000.00
.....	.....	.....	.....	.....	29,085,000	12,760,000.00	41,845,000.00
.....	.....	.....	.....	.....	28,665,000	9,250,000.00	37,915,000.00
.....	.....	.....	.....	.....	24,576,000	6,250,000.00	30,826,000.00
.....	.....	.....	56,496.90	.....	20,447,500	3,256,496.90	23,703,996.90
.....	.....	.....	4,369.00	.....	22,007,500	1,501,369.00	23,508,869.00
.....	.....	.....	20,652.40	.....	24,600,000	770,652.40	25,370,652.40
.....	.....	.....	445,445.00	.....	23,390,000	2,216,445.00	25,606,445.00
.....	304,000.00	.....	172,000.00	.....	25,148,500	1,133,000.00	26,281,500.00
.....	.....	.....	97,267.80	.....	19,748,000	797,267.80	20,545,267.80
.....	.....	.....	142,307.60	.....	16,055,000	8,372,680.60	24,427,680.60
.....	554,000.00	.....	319,611.60	.....	25,762,500	6,169,611.60	31,932,111.60
514,514.00	241,019.75	.....	99,071.00	.....	21,250,000	2,054,604.75	23,304,604.75
370,000.00	363,633.75	.....	249,140.10	.....	22,457,000	1,082,773.85	23,539,773.85
2,024,345.00	662,205.25	.....	2.40	.....	21,500,500	3,946,552.65	25,447,052.65
554,043.00	441,170.25	.....	112,000.00	.....	23,920,000	1,507,213.25	25,427,213.25
570,474.00	47,009.75	.....	57,505.60	.....	30,093,000	5,674,989.35	35,767,989.35
466,950.00	135,557.25	.....	134,284.40	.....	33,522,500	6,561,791.65	40,084,291.65
18,552,551.00	7,890,421.00	231,000	4,441,728.80	119,100	964,011,907	149,841,873.80	1,113,853,780.80

COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Carson City

Calendar years.	GOLD.			SILVER.	
	Double eagles.	Eagles.	Half eagles.	Dollars.	Trade dollars.
1870	$75,780	$59,080	$38,375	$12,462	
1871	293,740	71,850	103,850	1,376	
1872	593,000	55,000	84,900	3,150	
1873	448,200	45,430	37,080	2,300	$124,500
1874	2,301,700	167,670	105,990		1,373,200
1875	2,223,020	77,150	59,140		1,573,700
1876	2,768,820	46,960	34,435		509,000
1877	851,300	33,320	43,400		534,000
1878	263,600	32,440	45,270	2,212,000	97,000
1879	214,160	17,620	86,405	756,000	
1880		111,900	255,085	591,000	
1881		240,150	69,430	296,000	
1882	782,800	67,640	414,085	1,133,000	
1883	1,199,240	120,000	64,790	1,204,000	
1884	1,622,780	99,250	82,010	1,136,000	
1885	189,000			228,000	
1886 *a*					
1887 *a*					
1888 *a*					
1889 *b*	618,900			350,000	
1890	1,824,180	175,000	269,000	2,309,041	
1891	100,000	1,037,320	1,040,000	1,618,000	
1892	545,300	400,000	414,840	1,352,000	
1893 *c*	368,040	140,000	300,000	677,000	
Total	17,283,580	2,997,780	3,548,085	13,881,329	4,211,400

a Coinage suspended. *b* Operations resumed October 1, 1889.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1870, to June 30, 1893.]

SILVER.				TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Gold.	Silver.	
$27,308.50	$2,085.00	.....	.....	$173,235	$41,855.50	$215,090.50
69,975.00	2,722.50	.....	$2,010.00	469,440	76,083.50	545,523.50
136,000.00	2,275.00	.....	2,400.00	732,900	143,825.00	876,725.00
168,530.00	4,115.50	.....	3,119.10	530,710	302,564.60	833,274.60
29,500.00	.....	.....	1,081.70	2,575,360	1,403,781.70	3,979,141.70
504,000.00	35,000.00	$26,658	464,500.00	2,359,310	2,603,858.00	4,963,168.00
978,000.00	1,236,000.00	2,000	827,000.00	2,850,215	3,552,000.00	6,402,215.00
710,000.00	1,048,000.00	.....	770,000.00	928,020	3,062,000.00	3,990,020.00
31,000.00	249,000.00	.....	20,000.00	341,310	2,609,000.00	2,950,310.00
.....	.....	.....	.....	318,185	756,000.00	1,074,185.00
.....	.....	.....	.....	366,985	591,000.00	957,985.00
.....	.....	.....	.....	309,580	296,000.00	605,580.00
.....	.....	.....	.....	1,264,525	1,133,000.00	2,397,525.00
.....	.....	.....	.....	1,384,030	1,204,000.00	2,588,030.00
.....	.....	.....	.....	1,804,040	1,136,000.00	2,940,040.00
.....	.....	.....	.....	189,000	228,000.00	417,000.00
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	618,900	350,000.00	968,900.00
.....	.....	.....	.....	2,268,180	2,309,041.00	4,577,221.00
.....	.....	.....	.....	2,177,320	1,618,000.00	3,795,320.00
.....	.....	.....	.....	1,360,140	1,352,000.00	2,712,140.00
.....	.....	.....	.....	808,040	677,000.00	1,485,040.00
2,654,313.50	2,579,198.00	28,658	2,090,110.80	23,829,425	25,445,009.30	49,274,434.30

c Coinage suspended from May 23, 1893.

COINAGE OF THE MINTS OF THE UNITED STATES

RECAPITULATION.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793-1795		$27,950	$43,535			
1796		60,800	16,995		$165.00	
1797		91,770	32,030		4,390.00	
1798		79,740	124,335		1,535.00	
1799		174,830	37,255		1,200.00	
1800		259,650	58,110			
1801		292,540	130,030			
1802		150,900	265,880		6,530.00	
1803		89,790	167,530		1,057.50	
1804		97,950	152,375		8,317.50	
1805			165,915		4,452.50	
1806			320,465		4,040.00	
1807			420,465		17,030.00	
1808			277,890		6,775.00	
1809			169,375			
1810			501,435			
1811			497,905			
1812			290,435			
1813			477,140			
1814			77,270			
1815			3,175			
1816						
1817						
1818			242,940			
1819			258,615			
1820			1,319,030			
1821			173,205		16,120.00	
1822			88,980			
1823			72,425			
1824			86,700		6,500.00	
1825			145,300		11,085.00	
1826			90,345		1,900.00	
1827			124,565		7,000.00	
1828			140,145			
1829			287,210		8,507.50	
1830			631,755		11,350.00	
1831			702,970		11,300.00	
1832			787,435		11,000.00	
1833			968,150		10,400.00	
1834			3,660,845		293,425.00	
1835			1,857,670		328,505.00	
1836			2,765,735		1,369,965.00	
1837			1,035,605		112,700.00	
1838		72,000	1,600,420		137,345.00	
1839		382,480	802,745		191,622.50	
1840		473,380	1,048,530		153,572.50	
1841		656,310	380,945		54,602.50	
1842		1,089,070	655,330		85,007.50	
1843		2,506,240	4,275,425		1,327,132.50	
1844		1,250,610	4,087,715		89,345.00	
1845		736,530	2,743,640		276,277.50	
Carried forward		8,492,540	35,263,920		4,570,155.00	

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$204,791	$161,572.00	.....	.....	.....	$4,320.80	.....
.....	72,920	.....	$1,473.50	.....	$2,213.50	511.50	.....
.....	7,776	1,959.00	63.00	.....	2,526.10	2,226.35	.....
.....	327,536	.....	.....	.....	2,755.00	.....	.....
.....	423,515	.....	.....	.....	.....	.....	.....
.....	220,920	.....	.....	.....	2,176.00	1,200.00	.....
.....	54,454	15,144.50	.....	.....	3,464.00	1,695.50	.....
.....	41,650	14,945.00	.....	.....	1,097.50	650.50	.....
.....	66,064	15,857.50	.....	.....	3,304.00	1,892.50	.....
.....	19,570	78,259.50	1,684.50	.....	826.50	.....	.....
.....	321	105,861.00	30,348.50	.....	12,078.00	780.00	.....
.....	.....	419,788.00	51,531.00	.....	.....	.....	.....
.....	.....	525,788.00	55,160.75	.....	16,500.00	.....	.....
.....	.....	684,300.00	.....	.....	.....	.....	.....
.....	.....	702,905.00	.....	.....	4,471.00	.....	.....
.....	.....	638,138.00	.....	.....	635.50	.....	.....
.....	.....	601,822.00	.....	.....	6,518.00	.....	.....
.....	.....	814,029.50	.....	.....	.....	.....	.....
.....	.....	620,951.50	.....	.....	.....	.....	.....
.....	.....	519,537.50	.....	.....	42,150.00	.....	.....
.....	.....	.....	17,308.00	.....	.....	.....	.....
.....	.....	23,575.00	5,000.75	.....	.....	.....	.....
.....	.....	607,783.50	.....	.....	.....	.....	.....
.....	.....	980,161.00	90,293.50	.....	.....	.....	.....
.....	.....	1,104,000.00	36,000.00	.....	.....	.....	.....
.....	.....	375,561.00	31,861.00	.....	94,258.70	.....	.....
.....	.....	652,898.50	54,212.75	.....	118,651.20	.....	.....
.....	.....	779,786.50	16,020.00	.....	10,000.00	.....	.....
.....	.....	847,100.00	4,450.00	.....	44,000.00	.....	.....
.....	.....	1,752,477.00	.....	.....	.....	.....	.....
.....	.....	1,471,583.00	42,000.00	.....	51,000.00	.....	.....
.....	.....	2,002,090.00	.....	.....	.....	.....	.....
.....	.....	2,746,700.00	1,000.00	.....	121,500.00	.....	.....
.....	.....	1,537,600.00	25,500.00	.....	12,500.00	.....	.....
.....	.....	1,856,078.00	.....	.....	77,000.00	61,500.00	.....
.....	.....	2,382,400.00	.....	.....	51,000.00	62,000.00	.....
.....	.....	2,936,830.00	99,500.00	.....	77,135.00	62,185.00	.....
.....	.....	2,398,500.00	80,000.00	.....	52,250.00	48,250.00	.....
.....	.....	2,603,000.00	39,000.00	.....	48,500.00	68,500.00	.....
.....	.....	3,206,002.00	71,500.00	.....	63,500.00	74,000.00	.....
.....	.....	2,676,003.00	488,000.00	.....	141,000.00	138,000.00	.....
.....	1,000	3,273,100.00	118,000.00	.....	119,000.00	95,000.00	.....
.....	.....	1,814,910.00	63,100.00	.....	104,200.00	113,800.00	.....
.....	.....	1,773,000.00	208,000.00	.....	239,493.40	112,750.00	.....
.....	300	1,748,768.00	122,786.50	.....	229,638.70	108,285.00	.....
.....	61,005	1,145,054.00	153,331.75	.....	253,358.00	113,954.25	.....
.....	173,000	355,500.00	143,000.00	.....	363,000.00	98,250.00	.....
.....	184,618	1,484,882.00	214,250.00	.....	390,750.00	58,250.00	.....
.....	165,100	3,056,000.00	403,400.00	.....	152,000.00	58,250.00	.....
.....	20,000	1,885,500.00	290,300.00	.....	7,250.00	32,500.00	.....
.....	24,500	1,341,500.00	230,500.00	.....	198,500.00	78,200.00	.....
.....	2,069,040	56,739,200.50	3,188,575.50	.....	3,120,200.10	1,396,901.40	.....

COINAGE OF THE MINTS OF THE UNITED STATES

RECAPITULATION—Continued.

Calendar years	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	.....	$8,492,540	$35,263,920	.....	$4,570,155.00	.....
1846	.....	1,018,750	2,736,155	.....	279,272.50	.....
1847	.....	14,337,580	5,382,685	.....	482,060.00	.....
1848	.....	1,813,340	1,863,560	.....	98,612.50	.....
1849	.....	6,775,180	1,184,645	.....	111,147.50	$936,789
1850	$26,225,220	3,489,510	860,160	.....	895,547.50	511,301
1851	48,043,100	4,393,280	2,651,955	.....	3,867,337.50	3,658,820
1852	44,860,520	2,811,060	3,689,635	.....	3,283,827.50	2,201,145
1853	26,646,520	2,522,530	2,305,095	.....	3,519,615.00	4,384,149
1854	18,052,340	2,305,760	1,513,235	$491,214	1,896,397.50	1,657,016
1855	25,046,820	1,487,010	1,257,090	171,465	600,700.00	824,883
1856	30,437,560	1,429,900	1,806,665	181,530	1,213,117.50	1,788,996
1857	28,797,500	481,060	1,232,970	104,673	796,235.00	80[illegible],602
1858	21,873,480	343,210	439,770	6,319	144,082.50	131,472
1859	13,782,840	253,930	361,235	46,914	142,220.00	193,431
1860	22,584,400	278,830	352,365	42,465	164,360.00	51,234
1861	74,989,060	1,287,330	3,[illegible]32,130	18,216	3,241,205.00	527,499
1862	18,926,120	234,950	69,825	17,355	300,882.50	1,326,865
1863	22,187,200	112,480	97,360	15,117	27,075.00	6,250
1864	19,958,900	60,800	40,540	8,040	7,185.00	5,950
1865	27,874,000	207,050	144,535	3,495	62,302.50	3,725
1866	30,820,500	237,800	253,200	12,090	105,175.00	7,180
1867	23,436,300	121,400	179,600	7,950	78,125.00	5,250
1868	18,722,000	241,550	288,625	14,625	94,062.50	10,525
1869	17,238,100	82,850	163,925	7,575	84,612.50	5,925
1870	22,819,480	164,430	143,550	10,605	51,387.50	9,335
1871	20,456,740	254,650	245,000	3,990	68,375.00	3,930
1872	21,230,600	244,500	275,350	6,090	52,575.00	3,530
1873	55,456,700	173,680	754,605	75	512,562.50	125,125
1874	33,917,700	799,270	203,530	125,460	9,850.00	198,820
1875	32,737,820	78,350	105,240	60	30,050.00	420
1876	46,386,020	104,280	61,820	135	23,052.50	3,245
1877	43,504,700	211,490	182,660	4,464	92,630.00	3,920
1878	45,916,500	1,031,440	1,427,470	246,972	1,160,650.00	3,020
1879	28,889,260	6,120,320	3,727,155	9,090	331,225.00	3,030
1880	17,749,120	21,715,160	22,831,765	3,108	7,490.00	1,636
1881	14,585,200	48,796,250	33,458,430	1,650	1,700.00	7,660
1882	23,295,400	24,740,640	17,831,885	4,620	10,100.00	5,040
1883	24,980,040	2,595,400	1,647,990	2,820	4,900.00	10,840
1884	19,944,200	2,110,800	1,922,250	3,318	4,982.50	6,206
1885	13,875,560	4,815,270	9,065,030	2,730	2,217.50	12,205
1886	22,120	10,621,600	18,282,160	3,426	10,220.00	6,016
1887	5,662,420	8,706,800	9,560,435	18,480	15,705.00	8,543
1888	21,717,320	8,030,310	1,560,980	15,873	40,245.00	16,080
1889	16,995,120	4,298,850	37,825	7,287	44,120.00	30,729
1890	19,399,080	755,430	290,640	.....	22,032.50	.....
1891	25,891,340	1,956,000	1,347,065	.....	27,600.00	.....
1892	19,238,760	9,817,400	5,724,700	.....	6,362.50	.....
1893	27,178,320	20,132,450	9,610,985	.....	75,265.00	.....
1894	48,350,800	26,032,780	5,152,275	.....	10,305.00	.....
1895	45,163,120	7,148,260	7,289,680	.....	15,297.50	.....
1896	43,931,760	2,000,980	1,072,315	.....	48,005.00	.....
1897	57,070,220	12,774,090	6,109,415	.....	74,760.00	.....
Total	1,356,868,800	281,050,560	227,393,085	1,619,376	28,819,067.50	19,499,337

a Includes $475,000 in Columbian coins. *b* Includes $2,026,052.50 in Columbian coins.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$2,069,040	$56,739,200.50	$3,188,575.50	.....	$3,120,200.10	$1,396,901.40	.....
.....	169,600	2,257,000.00	127,500.00	.....	3,130.00	1,350.00	.....
.....	140,750	1,870,000.00	275,500.00	.....	24,500.00	63,700.00	.....
.....	15,000	1,880,000.00	36,500.00	.....	45,150.00	63,400.00	.....
.....	62,600	1,781,000.00	85,000.00	.....	113,900.00	72,450.00	.....
.....	47,500	1,341,500.00	150,700.00	.....	244,150.00	82,250.00	.....
.....	1,300	301,375.00	62,000.00	.....	142,650.00	82,050.00	$185,022.00
.....	1,100	110,565.00	68,265.00	.....	196,550.00	63,025.00	559,905.00
.....	46,110	2,430,354.00	4,146,555.00	.....	1,327,301.00	785,251.00	342,000.00
.....	33,140	4,111,000.00	3,466,000.00	.....	624,000.00	365,000.00	20,130.00
.....	26,000	2,288,725.00	857,350.00	.....	207,500.00	117,500.00	4,170.00
.....	63,500	1,903,500.00	2,129,500.00	.....	703,000.00	299,000.00	43,740.00
.....	94,000	1,482,000.00	2,726,500.00	.....	712,000.00	433,000.00	31,260.00
.....	.....	5,998,000.00	2,002,250.00	.....	189,000.00	258,000.00	48,120.00
.....	636,500	2,074,000.00	421,000.00	.....	97,000.00	45,000.00	10,950.00
.....	733,930	1,032,850.00	312,350.00	.....	78,700.00	92,950.00	8,610.00
.....	78,500	2,078,950.00	1,237,650.00	.....	209,650.00	164,050.00	14,940.00
.....	12,090	802,175.00	249,887.50	.....	102,830.00	74,627.50	10,906.50
.....	27,660	709,830.00	48,015.00	.....	17,196.00	5,923.00	643.80
.....	31,170	518,785.00	28,517.50	.....	26,907.00	4,523.50	14.10
.....	47,000	593,450.00	25,075.00	.....	18,550.00	6,675.00	255.00
.....	49,625	899,812.50	11,381.25	.....	14,372.50	6,536.25	681.75
.....	60,325	810,162.50	17,156.25	.....	14,662.50	6,431.25	138.75
.....	182,700	769,100.00	31,500.00	.....	72,625.00	18,295.00	123.00
.....	424,300	725,950.00	23,150.00	.....	70,660.00	21,930.00	153.00
.....	445,462	829,758.50	23,935.00	.....	52,150.00	26,830.00	120.00
.....	1,117,136	1,741,655.00	53,255.50	.....	109,371.00	82,493.00	127.80
.....	1,118,600	866,775.00	68,762.50	.....	261,045.00	189,247.50	58.50
$1,225,000	296,600	1,593,780.00	414,190.50	.....	443,329.10	51,830.00	18.00
4,910,000	.....	1,406,650.00	215,975.00	.....	319,151.70	.....	.....
6,279,600	.....	5,117,750.00	1,278,375.00	$265,598	2,406,570.00	.....	.....
6,192,150	.....	7,451,575.00	7,839,287.50	5,180	3,015,115.00	.....	.....
13,092,710	.....	7,540,255.00	6,024,927.50	102	1,735,051.00	.....	.....
4,259,900	22,495,550	726,200.00	849,200.00	120	187,880.00	.....	.....
1,541	27,560,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	27,397,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	27,927,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	27,574,100	2,750.00	4,075,00	.....	391,110.00	.....	.....
979	28,470,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	28,136,875	2,637.50	2,218.75	.....	393,134.90	.....	.....
.....	28,697,767	3,065.00	3,632.50	.....	257,711.70	.....	.....
.....	31,423,886	2,943.00	1,471.50	.....	658,409.40	.....	.....
.....	33,611,710	2,855.00	2,677.50	.....	1,573,838.90	.....	.....
.....	31,990,833	6,416.50	306,708.25	.....	721,648.70	.....	.....
.....	34,651,811	6,355.50	3,177.75	.....	835,338.90	.....	.....
.....	38,043,004	6,295.00	20,147.50	.....	1,133,461.70	.....	.....
.....	23,562,735	100,300.00	1,551,150.00	.....	2,304,671.60	.....	.....
.....	6,333,245	a 1,652,136.50	2,960,331.00	.....	1,695,365.50	.....	.....
.....	1,455,792	b 4,003,948.50	c 2,583,837.50	.....	759,219.30	.....	.....
.....	3,093,972	3,667,831.00	2,233,448.25	.....	205,099.60	.....	.....
.....	862,880	2,354,652.00	2,255,390.25	.....	225,088.00	.....	.....
.....	19,876,762	1,507,855.00	1,386,700.25	.....	318,581.80	.....	.....
.....	12,651,731	2,023,315.50	2,524,440.00	.....	1,287,810.80	.....	.....
35,965,924	463,849,360	138,144,873.50	54,349,709.75	271,000	30,441,651.90	4,880,219.40	1,282,087.20

c Includes $10,005.75 in Columbian coins.

COINAGE OF THE MINTS OF THE UNITED STATES

RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793–1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
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1844			
1845			
1846			
Carried forward			

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$10, 660. 33	$712. 67	$71, 485. 00	$370, 683. 80	$11, 373. 00	$453, 541. 80
9, 747. 00	577. 40	77, 960. 00	77, 118. 50	10, 324. 40	165, 402. 90
8, 975. 10	535. 24	128, 190. 00	14, 550. 45	9, 510. 34	152, 250. 79
9, 797. 00	.....	205, 610. 00	330, 291. 00	9, 797. 00	545, 698. 00
9, 045. 85	60. 83	213, 285. 00	423, 515. 00	9, 106. 68	645, 906. 68
28, 221. 75	1, 057. 65	317, 760. 00	224, 296. 00	29, 279. 40	571, 335. 40
13, 628. 37	.....	422, 570. 00	74, 758. 00	13, 628. 37	510, 956. 37
34, 351. 00	71. 83	423, 310. 00	58, 343. 00	34, 422. 83	516, 075. 83
24, 713. 53	489. 50	258, 377. 50	87, 118. 00	25, 203. 03	370, 698. 53
7, 568. 38	5, 276. 56	258, 642. 50	100, 340. 50	12, 844. 94	371, 827. 94
9, 411. 16	4, 072. 32	170, 367. 50	149, 388. 50	13, 483. 48	333, 239. 48
3, 480. 00	1, 780. 00	324, 505. 00	471, 319. 00	5, 260. 00	801, 084. 00
7, 272. 21	2, 380. 00	437, 495. 00	597, 448. 75	9, 652. 21	1, 044, 595. 96
11, 090. 00	2, 000. 00	284, 665. 00	684, 300. 00	13, 090. 00	982, 055. 00
2, 228. 67	5, 772. 86	169, 375. 00	707, 376. 00	8, 001. 53	884, 752. 53
14, 585. 00	1, 075. 00	501, 435. 00	638, 773. 50	15, 660. 00	1, 155, 868. 50
2, 180. 25	315. 70	497, 905. 00	608, 340. 00	2, 495. 95	1, 108, 740. 95
10, 755. 00	.....	290, 475. 00	814, 029. 50	10, 755. 00	1, 115, 219. 50
4, 180. 00	.....	477, 140. 00	620, 951. 50	4, 180. 00	1, 102, 271. 50
3, 578. 30	.....	77, 270. 00	561, 687. 50	3, 578. 30	642, 535. 80
.....	.....	3, 175. 00	17, 308. 00	.....	20, 483. 00
28, 209. 82	.....	.....	28, 575. 75	28, 209. 82	56, 785. 57
39, 484. 00	.....	.....	607, 783. 50	39, 484. 00	647, 267. 50
31, 670. 00	.....	242, 940. 00	1, 070, 454. 50	31, 670. 00	1, 345, 064. 50
26, 710. 00	.....	258, 615. 00	1, 140, 000. 00	26, 710. 00	1, 425, 325. 00
44, 075. 50	.....	1, 319, 030. 00	501, 680. 70	44, 075. 50	1, 864, 786. 20
3, 890. 00	.....	189, 325. 00	825, 762. 45	3, 890. 00	1, 018, 977. 45
20, 723. 39	.....	88, 980. 00	805, 806. 50	20, 723. 39	915, 509. 89
.....	.....	72, 425. 00	895, 550. 00	.....	967, 975. 00
12, 620. 00	.....	93, 200. 00	1, 752, 477. 00	12, 620. 00	1, 858, 297. 00
14, 611. 00	315. 00	156, 385. 00	1, 564, 583. 00	14, 926. 00	1, 735, 894. 00
15, 174. 25	1, 170. 00	92, 245. 00	2, 002, 090. 00	16, 344. 25	2, 110, 679. 25
23, 577. 32	.....	131, 565. 00	2, 869, 200. 00	23, 577. 32	3, 024, 342. 32
22, 606. 24	3, 030. 00	140, 145. 00	1, 575, 600. 00	25, 636. 24	1, 741, 381. 24
14, 145. 00	2, 435. 00	295, 717. 50	1, 994, 578. 00	16, 580. 00	2, 306, 875. 50
17, 115. 00	.....	643, 105. 00	2, 495, 400. 00	17, 115. 00	3, 155, 620. 00
33, 592. 60	11. 00	714, 270. 00	3, 175, 600. 00	33, 603. 60	3, 923, 473. 60
23, 620. 00	.....	798, 435. 00	2, 579, 000. 00	23, 620. 00	3, 401, 055. 00
27, 390. 00	770. 00	978, 550. 00	2, 759, 000. 00	28, 160. 00	3, 765, 710. 00
18, 551. 00	600. 00	3, 954, 270. 00	3, 415, 002. 00	19, 151. 00	7, 388, 423. 00
38, 784. 00	705. 00	2, 186, 175. 00	3, 443, 003. 00	39, 489. 00	5, 668, 667. 00
21, 110. 00	1, 990. 00	4, 135, 700. 00	3, 606, 100. 00	23, 100. 00	7, 764, 900. 00
55, 583. 00	.....	1, 148, 305. 00	2, 096, 010. 00	55, 583. 00	3, 299, 898. 00
63, 702. 00	.....	1, 809, 765. 00	2, 333, 243. 40	63, 702. 00	4, 206, 710. 40
31, 286. 61	.....	1, 376, 847. 50	2, 209, 778. 20	31, 286. 61	3, 617, 912. 31
24, 627. 00	.....	1, 675, 482. 50	1, 726, 703. 00	24, 627. 00	3, 426, 812. 50
15, 973. 67	.....	1, 091, 857. 50	1, 132, 750. 00	15, 973. 67	2, 240, 581. 17
23, 833. 90	.....	1, 829, 407. 50	2, 332, 750. 00	23, 833. 90	4, 185, 991. 40
24, 283. 20	.....	8, 108, 797. 50	3, 834, 750. 00	24, 283. 20	11, 967, 830. 70
23, 987. 52	.....	5, 427, 670. 00	2, 235, 550. 00	23, 987. 52	7, 687, 207. 52
38, 948. 04	.....	3, 756, 447. 50	1, 873, 200. 00	38, 948. 04	5, 668, 595. 54
41, 208. 00	.....	4, 034, 177. 50	2, 558, 580. 00	41, 208. 00	6, 633, 965. 50
1, 046, 560. 96	37, 203. 56	52, 300, 792. 50	69, 072, 497. 50	1, 083, 764. 52	122, 517, 054. 52

COINAGE OF THE MINTS OF THE UNITED STATES

RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward			
1847			
1848			
1849			
1850			
1851			
1852			
1853			
1854			
1855			
1856			
1857			
1858			
1859			
1860			
1861			
1862			
1863			
1864			$396, 950. 00
1865		$341, 460. 00	272, 800. 00
1866	$737, 125. 00	144, 030. 00	63, 540. 00
1867	1, 545, 475. 00	117, 450. 00	58, 775. 00
1868	1, 440, 850. 00	97, 560. 00	56, 075. 00
1869	819, 750. 00	48, 120. 00	30, 930. 00
1870	240, 300. 00	40, 050. 00	17, 225. 00
1871	28, 050. 00	18, 120. 00	14, 425. 00
1872	301, 800. 00	25, 860. 00	1, 300. 00
1873	227, 500. 00	35, 190. 00	
1874	176, 900. 00	23, 700. 00	
1875	104, 850. 00	6, 840. 00	
1876	126, 500. 00	4, 860. 00	
1877			
1878	117. 50	70. 50	
1879	1, 455. 00	1, 236. 00	
1880	997. 75	748. 65	
1881	3, 618. 75	32, 417. 25	
1882	573, 830. 00	759. 00	
1883	1, 148, 471. 05	318. 27	
1884	563, 697. 10	169. 26	
1885	73, 824. 50	143. 70	
1886	166, 514. 50	128. 70	
1887	763, 182. 60	238. 83	
1888	536, 024. 15	1, 232. 49	
1889	794, 068. 05	646. 83	
1890	812, 963. 60		
1891	841, 717. 50		
1892	584, 982. 10		
1893	668, 509. 75		
1894	270, 656. 60		
1895	498, 994. 20		
1896	442, 146. 00		
1897	1, 021, 436. 75		
Total	15, 516, 307. 45	941, 349. 48	912, 020. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$1,046,560.96	$37,203.56	$52,360,792.50	$69,072,497.50	$1,083,764.52	$122,517,054.52
61,836.69	.....	20,202,325.00	2,374,450.00	61,836.69	22,638,611.69
64,157.99	.....	3,775,512.50	2,040,050.00	64,157.99	5,879,720.49
41,785.00	199.32	9,007,761.50	2,114,950.00	41,984.32	11,164,695.82
44,268.44	199.06	31,981,738.50	1,866,100.00	44,467.50	33,692,306.00
98,897.07	738.36	62,614,492.50	774,397.00	99,635.43	63,488,524.93
50,630.94	.....	56,846,187.50	999,410.00	50,630.94	57,896,228.44
66,411.31	648.47	39,377,909.00	9,077,571.00	67,059.78	48,522,539.78
42,361.56	276.79	25,915,962.50	8,619,270.00	42,638.35	34,577,870.85
15,748.29	282.50	29,387,968.00	3,501,245.00	16,030.79	32,905,243.79
26,904.63	202.15	36,857,768.50	5,142,240.00	27,106.78	42,027,115.28
177,834.56	175.90	32,214,040.00	5,478,760.00	178,010.46	37,870,810.46
246,000.00	.....	22,938,413.50	8,495,370.00	246,000.00	31,679,783.50
364,000.00	.....	14,780,570.00	3,284,450.00	364,000.00	18,429,020.00
205,660.00	.....	23,473,654.00	2,259,390.00	205,660.00	25,938,704.00
101,000.00	.....	83,395,530.00	3,783,740.00	101,000.00	87,280,270.00
280,750.00	.....	20,875,997.50	1,252,516.50	280,750.00	22,409,264.00
498,400.00	.....	22,445,482.00	809,267.80	498,400.00	23,753,149.80
529,737.14	.....	20,081,415.00	609,917.10	926,687.14	21,618,019.24
354,292.86	.....	28,295,107.50	691,005.00	968,552.86	29,954,665.36
98,265.00	.....	31,435,945.00	982,409.25	1,042,960.00	33,461,314.25
98,210.00	.....	23,828,625.00	908,876.25	1,819,910.00	26,557,411.25
102,665.00	.....	19,371,387.50	1,074,343.00	1,697,150.00	22,142,880.50
64,200.00	.....	17,582,987.50	1,266,143.00	963,000.00	19,812,130.50
52,750.00	.....	23,198,787.50	1,378,255.50	350,325.00	24,927,368.00
39,295.00	.....	21,032,685.00	3,104,038.30	99,890.00	24,236,613.30
40,420.00	.....	21,812,645.00	2,504,488.50	369,380.00	24,686,513.50
116,765.00	.....	57,022,747.50	4,024,747.60	379,455.00	61,426,950.10
141,875.00	.....	35,254,630.00	6,851,776.70	342,475.00	42,448,881.70
135,280.00	.....	32,951,940.00	15,347,893.00	246,970.00	48,546,803.00
79,440.00	.....	46,579,452.50	24,503,307.50	210,800.00	71,293,560.00
8,525.00	.....	43,999,864.00	28,393,045.50	8,525.00	72,401,434.50
57,998.50	.....	49,786,052.00	28,518,850.00	58,186.50	78,363,088.50
162,312.00	.....	39,080,080.00	27,569,776.00	165,003.00	66,814,859.00
389,649.55	.....	62,308,279.00	27,411,693.75	391,395.95	90,111,368.70
392,115.75	.....	96,850,890.00	27,940,163.75	428,151.75	125,219,205.50
385,811.00	.....	65,887,685.00	27,973,132.00	960,400.00	94,821,217.00
455,981.09	.....	29,241,990.00	29,246,968.45	1,604,770.41	60,093,728.86
232,617.42	.....	23,991,756.50	28,534,866.15	796,483.78	53,323,106.43
117 653.84	.....	27,773,012.50	28,962,176.20	191,622.04	56,926,810.74
176,542.90	.....	28,945,542.00	32,086,709.90	343,186.10	61,375,438.00
452,264.83	.....	23,972,383.00	35,191,081.40	1,215,686.26	60,379,150.66
374,944.14	.....	31,380,808.00	33,025,606.45	912,200.78	65,318,615.23
488,693.61	.....	21,413,931.00	35,496,683.15	1,283,408.49	58,194,022.64
571,828.54	.....	20,467,182.50	39,202,908.20	1,384,792.14	61,054,882.84
470,723.50	.....	29,222,005.00	27,518,856.60	1,312,441.00	58,053,302.60
376,498.32	.....	34,787,222.50	12,641,078.00	961,480.42	48,389,780.92
466,421.95	.....	56,997,020.00	8,802,797.30	1,134,931.70	66,934,749.00
167,521.32	.....	79,546,160.00	9,200,350.85	438,177.92	89,184,688.77
383,436.36	.....	59,616,357.50	5,698,010.25	882,430.56	66,196,798.31
390,572.93	.....	47,053,060.00	23,089,899.05	832,718.93	70,975,677.98
504,663.30	.....	76,028,485.00	18,487,297.30	1,526,100.05	96,041,882.35
12,313,178.29	39,926.11	1,915,250,225.50	729,184,825.75	29,722,781.33	2,674,157,832.58

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